Summary of
Northern Contaminants Program
Projects for 2000-2001

Indian and Northern Affairs Canada
Affaires indiennes et du Nord Canada
Canada

Summary of

Northern Contaminants Program

Projects for 2000-2001

Foreword

106-00529/

The Northern Contaminants Program (NCP) was established in 1991 in response to studies which showed the presence of contaminants in the Arctic ecosystem. Many of these contaminants had no Arctic sources. The three main contaminant groups of concern are persistent organic pollutants, heavy metals, and radionuclides. Some of these contaminants are found at unexpectedly high levels in animals at the top of the food chain and in humans. The NCP brings together federal departments (Indian and Northern Affairs, Health Canada, Environment Canada, and Fisheries and Oceans), the three territorial government departments (Yukon, Northwest Territories, and Nunavut), Northern Aboriginal organizations (Council of Yukon First Nations, Dene Nation, Inuit Tapirisat of Canada, Inuit Circumpolar Conference and the Métis Nation-NWT) and university researchers to work towards reducing and wherever possible, eliminating contaminants in traditionally-harvested foods and to provide information that assists informed decision-making by individuals and communities in their food use.

The NCP – Phase II is a five year program (1998 – 2003) which funds research on northern contaminants issues at about $5.4 million per year, in addition to supporting the Centre for Indigenous Peoples' Nutrition and Environment (CINE) and the participation of Aboriginal organizations. A portion of the funds are directed to communicating the research results to communities. The communications part of the program is lead by the representatives of the Northern Aboriginal organizations. Under Phase II, the NCP has a greater emphasis on human health research, developing effective community dialogue, increasing community participation, and working towards international agreements to control the release of contaminants.

People and organizations seeking funding for projects related to northern contaminants issues submit proposals to the NCP each year. A management committee consisting of representatives from government and Northern Aboriginal organizations meets to evaluate the proposals and approve funding for projects which meet the goals of the program. Anyone conducting research in the North is required to consult with the communities that will be involved in the research and complete consent forms. Project leaders are required to present their results at an annual NCP workshop, and to submit a brief description of their research results at the end of the year. Ever year since 1991 these results have been published as the "Synopsis of *Research Conducted under the Northern Contaminants Program*". These documents are available by contacting the NCP. More information about the program can be found on the NCP website: http://www.inac.gc.ca/ncp/

This booklet, the "*Summary of Northern Contaminants Program Projects for 2000 – 2001*" provides a quick, non-scientific reference guide for communities on current-year projects being conducted by the NCP.

How to Use this Booklet

To help you find the information in this booklet that is of interest to you:

- The booklet is divided into five sections based on the geographical location of where projects are or will be mainly occurring (The Yukon Territory, The Northwest Territories, Nunavut, Nunavik/Labrador and Other Locations).

- Each project summary contains the question the project is answering, relevance (why the project is occurring), summary, and location.
- There are "icons" (please see following page) located throughout the pages of the booklet to help communicate what the project is about, how you can get more information about the project, and where and when the project is occurring.
- The **bolded** words within the text of the booklet are defined in the Glossary of Terms in Appendix A at the end of the booklet.
- If you wish to search for a project by affiliation or project leader, or by key subject areas and contaminant, please refer to Appendix B (Affiliations and Project Leaders) and Appendix C (Key Subject Areas and Contaminants) at the end of the booklet.
- If you have more questions about any of these projects, contaminants in the North or contaminants in general, there is a list of people whom you can contact for this information in Appendix D (For More Information) at the end of the booklet.

EXPLANATION OF ICONS USED IN THIS BOOKLET
Description of what information the ICON is trying to communicate:

PROJECT CATEGORY

Human Health project

Monitoring/International project

Communications project

International Policy project

What the project is studying:

Persistent Organic Pollutants (POPs)

Heavy Metal Contaminants

Radionuclide Contaminants

Hg Mercury

TK Traditional Knowledge

Traditional/ Country Food

Education

Administration

QA/QC Quality Assurance/ Quality Control

Seals

Walrus

Whales

Fish

Seaducks

Seabirds

Arctic fox

Polar bear

Caribou

Marine Mammals

People

Snow

Ice

Rain

Water

Ocean

Air

Sediment

Other Details:

The project involves work taking place in a laboratory

The project involves computer models and database work

The project involves a workshop and/or a meeting

Contact Information

The time frame of the project

The schedule of the project

The location of the project

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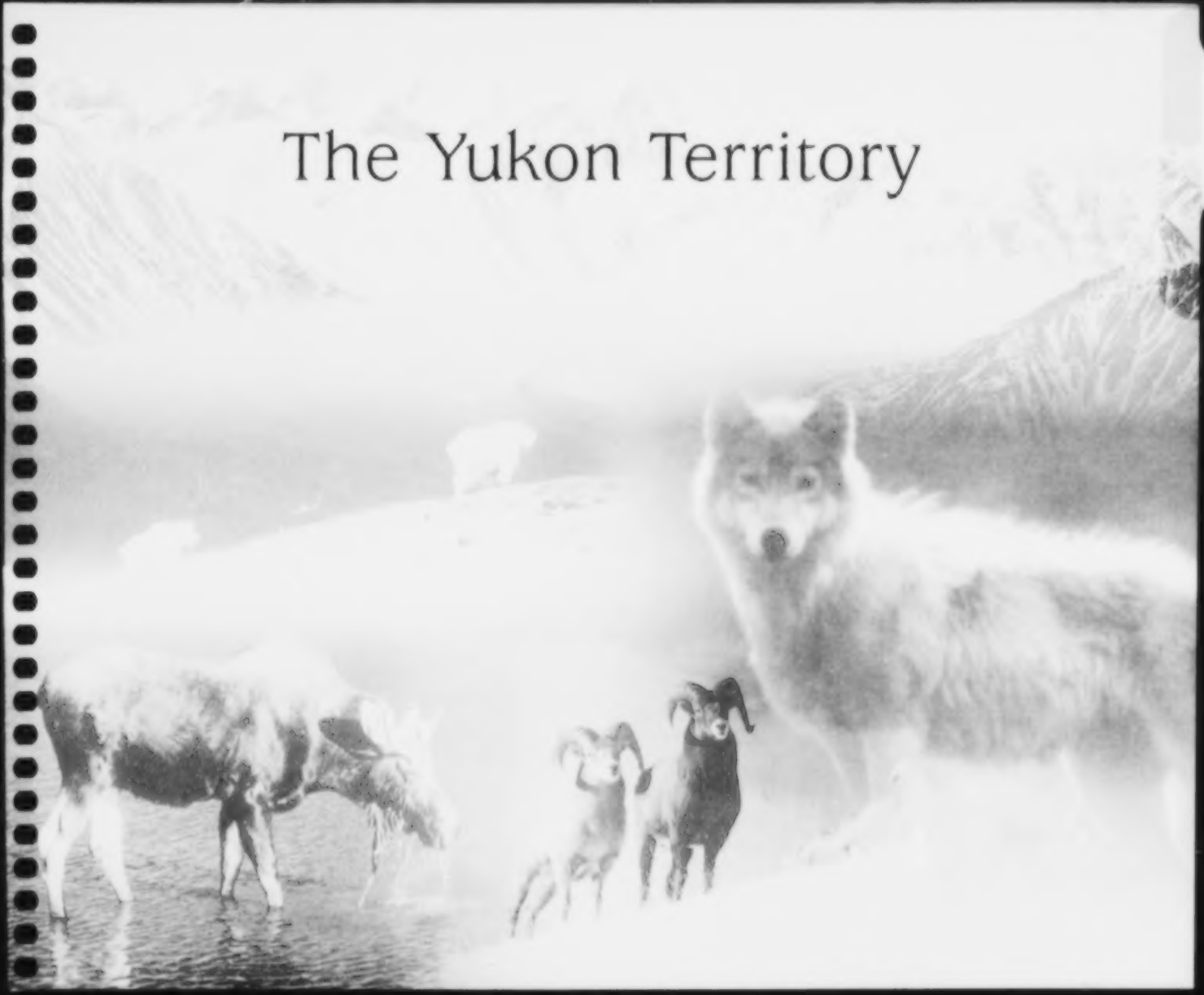


The Yukon Territory

Frontline Training for Community Professionals

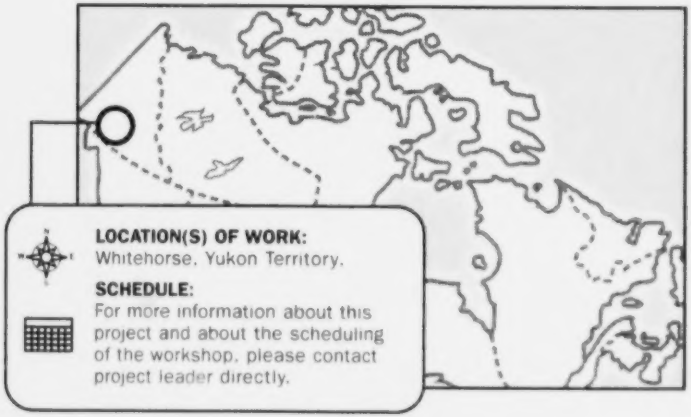
Q What is being done to ensure that key people in communities have training to deal with information on contaminants?

RELEVANCE:

In recent years, a tremendous amount of information, especially in the area of human health, has been available to communities throughout the North. Yukon First Nations have raised concerns about the capacity of communities to understand and communicate **contaminants** information from the **Northern Contaminants Program (NCP)**. A training course was developed for frontline professionals working in northern communities, particularly Community Health Representatives (CHRs), who may be asked to deal with contaminant information as part of their work. As well as an overview of the NCP and its major findings to date, the course also stresses ways of communicating contaminant information, and the nutritional, economic and cultural benefits of harvesting traditional/country food species.

PROJECT SUMMARY:

The Frontline Training Course for Community Professionals has been tested and delivered throughout a number of communities across the North. The Northwest Territories training package has been modified to meet the needs of Yukon First Nations. This project will further modify the frontline training package for Yukon First Nations by providing new information and suggestions for improvement. This year, a two-day training session on contaminants for CHRs and community representatives from all communities and First Nations in the Yukon who are dealing with contaminant issues will be held in Whitehorse.



LOCATION(S) OF WORK:
Whitehorse, Yukon Territory.

SCHEDULE:
For more information about this project and about the scheduling of the workshop, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Cindy Dickson
Council of Yukon First Nations
11 Nisutlin Drive
Whitehorse, Yukon
Y1A 3S4

Phone: (867) 667-7631
Fax: (867) 668-6577
E-Mail: ncp.cyfn@yukon.net

TIME FRAME:
April 2000 – March 2001.

RELATED PROJECTS:
Related projects include "Frontline Training Course for Community Professionals: Métis Nation-NWT and Dene Nation" page 22 in booklet, and "Frontline Training for Community Representatives in Labrador" page 110 in booklet.

The Council of Yukon First Nations – Contaminants Website

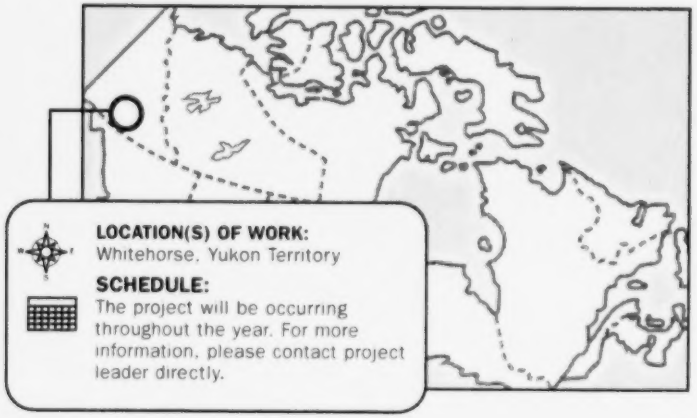
Q How will a website help to communicate information on contaminants?

RELEVANCE:

Important information on **contaminants** and traditional diet has been generated through the **Northern Contaminants Program (NCP)**. For example, the Council of Yukon First Nations (CYFN) and the Centre for Indigenous Peoples' Nutrition and Environment (CINE) have conducted research and held many workshops on traditional/country foods and contaminants. The Yukon Contaminants Committee (YCC) has developed a database that contains information on levels of **persistent organic pollutants (POPs)** and **heavy metals** in fish, birds, mammals, and plants from across the Yukon. Communities will benefit from having this information on contaminants and traditional/country food accessible through the internet. As well, a contaminants website will reduce costs of distributing and publishing information and simplify access to this information.

PROJECT SUMMARY:

The CYFN – Contaminants Website will be designed as an educational and information tool that can be accessed easily by community members, health professionals, organizations, instructors, students and those interested in learning about the effects of atmospheric **long-range transport** of contaminants into the North. The website will be developed through consultation with potential users. Contaminants information currently available from the NCP, YCC, and Canadian Arctic Indigenous Peoples Against POPs (CAIPAP) will be organized to make it easily accessible and understandable to Northerners. Visitors to the website will be able to search text and database material. Diagrams, illustrations and photographs will be displayed, and videos produced by CYFN and NCP will also be available for viewing online. As well, a special "kid's" section based upon school curriculum material on contaminants in the North will be featured.



LOCATION(S) OF WORK:
Whitehorse, Yukon Territory

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Cindy Dickson
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11 Nisutlin Drive
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Y1A 3S4

Phone: (867) 667-7631
Fax: (867) 668-6577
E-mail: ncp.cyfn@yukon.net

TIME FRAME:
April 2000 – March 2001. Results of this project will be reported at the Annual NCP Results Workshop.

RELATED PROJECTS:
Related projects include "Video: Contaminants in the Canadian North" page 36 in booklet.

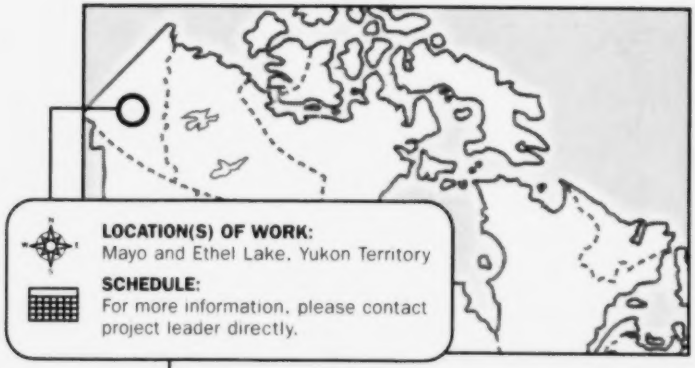
TK

State of the Environment 2000" – A First Nation Perspective on the Land and Environment

Q What is the role of traditional knowledge in contaminants-related work?

RELEVANCE:
When elders gather to discuss environmental concerns, discussions often focus on economic development and the effect it has had on the environment. The First Nation of Nacho Nyak Dun Lands and Resources Department has developed a workplan which deals with responsible environmental management and relates traditional knowledge (TK) with decision making and data collection. Elders need to play the lead role in determining how there can be responsible development in the future, while ensuring that cultures and traditions of First Nations are not compromised.

PROJECT SUMMARY:
This project will facilitate discussions between Yukon First Nations' elders and youth regarding TK and the role it plays in responsible sustainable development. It will build upon existing **contaminants**-related programming, delivered by the Lands and Resources Department, by identifying and recording concerns and common interests related to the contaminants in the **food chain**. It will also help gain a perspective on the state of the environment in the Yukon from a traditional standpoint. The main activity will be focussed on a TK workshop proposed for early June, 2000 at Ethel Lake, Yukon. All Yukon First Nations' elders and youth will be invited to participate. Other governments will also be invited to give presentations on their mandates and to communicate their activities pertaining to the environmental issues and concerns of the First Nations' people.



LOCATION(S) OF WORK:
Mayo and Ethel Lake, Yukon Territory

SCHEDULE:
For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: John Pattimore
First Nation of Nacho Nyak Dun
Lands and Resources Department
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Mayo, Yukon
Y0B 1M0

Phone: (867) 996-2415
Fax: (867) 996-2829

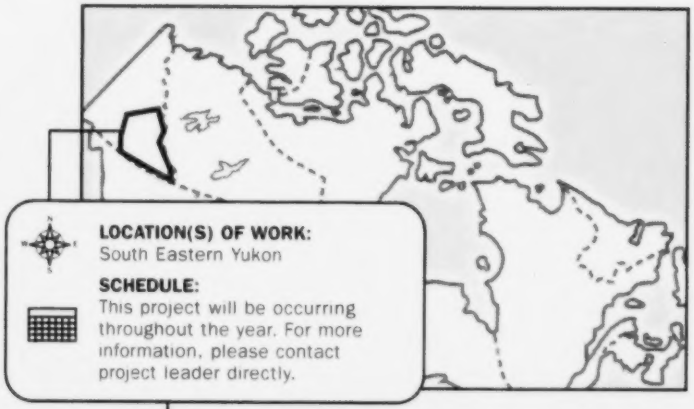
TIME FRAME:
April 2000 – March 2001. A brief report will be available at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

Benefits and Risks of Traditional/Country Foods, South Eastern Yukon

Q How can we communicate the benefits and risks of consuming traditionally harvested food?

RELEVANCE:
The people of the South Eastern Yukon Region need to understand **contaminants** and health-related information on the benefits and risks of consuming locally harvested foods. With this information, they will be able to make informed decisions on the use of traditional/country food and the possible associated health implications.

PROJECT SUMMARY:
This project will organize the results of northern contaminants research and other related material on the benefits and risks of traditional/country foods into an educational presentation. A communications strategy reflecting cultural considerations, in particular language differences, will be designed to present human health-related information to individuals and groups. A database and library of contaminants information and a reference list of professional individuals who can participate in future contaminants educational and communications initiatives will also be available to the people of the South Eastern Yukon Region.



LOCATION(S) OF WORK:
South Eastern Yukon

SCHEDULE:
This project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Vera Sterriah
Ross River Dena Council
General Delivery
Ross River, Yukon
Y0B 1S0

Phone: (867) 969-2832
Fax: (867) 969-2525

TIME FRAME:
April 2000 – March 2001.

RELATED PROJECTS:
Related projects include "Communication of Dietary Benefit-Risk Information to Five Inuit Regions" page 66 in booklet.

Yukon Contaminants Committee Communications Program

Q How can communities in the Yukon find out more about contaminants research and have opportunities to get involved in the Northern Contaminants Program?

RELEVANCE:

Under the **Northern Contaminants Program (NCP)**, the Yukon Contaminants Committee (YCC) co-ordinates **contaminants** information, research initiatives and communication efforts. The committee membership is diverse and consists of representatives from several federal and territorial departments, the Council of Yukon First Nations (CYFN), the Yukon Conservation Society and Yukon College. Several individual First Nations also play a key role on the Committee.

Since its establishment, the YCC has acted as a link between the scientific community and Northerners on local, national and international contaminants issues and has tried to answer the questions Yukonners have regarding contaminants in the North:

"Can we eat our traditional/country foods and drink our water?"

"Where are the contaminants coming from?"

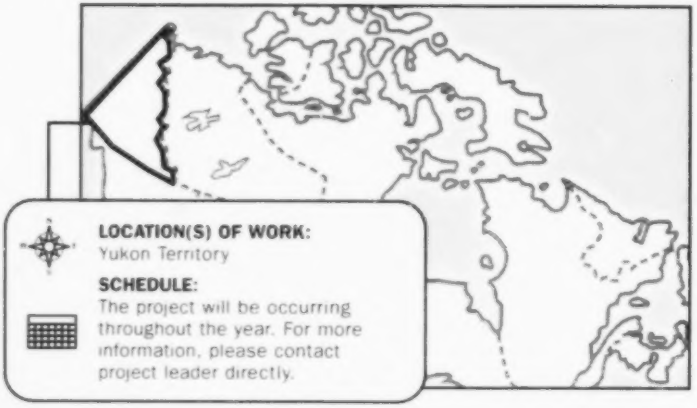
"Can we stop the contaminants from getting in the environment?"

"Are there health effects?"

The Department of Indian Affairs and Northern Development Whitehorse (DIAND) office provides secretariat support and the chair to the YCC.

PROJECT SUMMARY:

The YCC will continue to co-ordinate contaminants studies in the Yukon and communicate the results from all research projects as well as from other national and international initiatives. The YCC will review all NCP project proposals involving communication initiatives in the Yukon as well as all Yukon project proposals for socio-cultural content. Committee members will continue to make themselves available to communities to discuss contaminant issues and will attend community meetings and workshops as required.



LOCATION(S) OF WORK:
Yukon Territory

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Mark Palmer
Yukon Contaminants Committee
Department of Indian and Northern Affairs (DIAND)
Yukon Region
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Y1A 2B5

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TIME FRAME:
April 2000 – March 2001.

RELATED PROJECTS:
Related projects include "Northwest Territories Environmental Contaminants Committee" page 40 in booklet, and "Nunavut Environmental Contaminants Committee" page 68 in booklet.

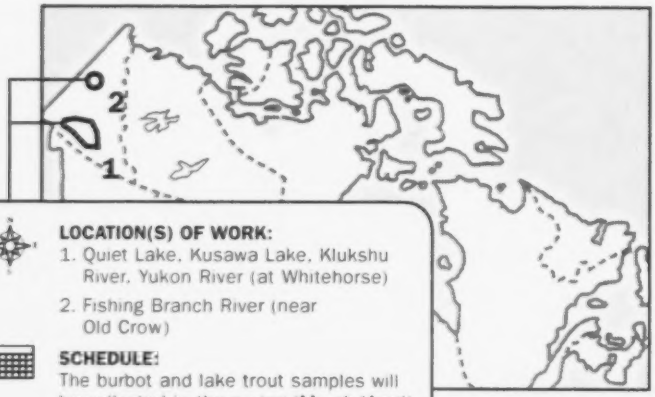
Yukon Traditional/Country Foods Monitoring Program

Q Are the levels of contaminants in Yukon wildlife changing over time?

RELEVANCE:
Elevated levels of **persistent organic pollutants (POPs)** have been found in tissue samples of fish from headwater lakes in the Yukon river system. The Yukon Contaminants Committee (YCC), as part of the **Northern Contaminants Program (NCP)**, has been trying to answer questions and concerns from Northerners on contaminants in traditional/country foods through a traditional/country foods monitoring program. The results from this monitoring program have shown that **contaminant** levels in the Yukon are comparable to other areas in the North, and that almost all traditional/country food is safe to eat.

PROJECT SUMMARY:
This study is part of a continuing program to monitor the levels and trends of contaminants in Yukon traditional/country foods, compare results to those from earlier years, and address concerns raised by people in the Yukon regarding the safety of their foods. Burbot liver and lake trout flesh samples will be collected from Quiet Lake and Kusawa Lake. These lakes have been selected because historical data and **archived** samples exist for the selected fish, the lake water chemistry is known, the fish population is high enough to support sample collection, both lakes support subsistence fisheries, and neither lake has local sources of contamination. Salmon tissue samples will also be collected from the following rivers: Klukshu (sockeye), Yukon at Whitehorse (king), and Fishing Branch River near Old Crow (chum). All salmon sampling locations support subsistence fisheries.

Fish samples will be analyzed for a number of POPs. A portion of each sample collected will be archived for future reference. No samples of caribou or moose will be collected this year; however, a detailed proposal for sampling moose and caribou will be submitted next year.



LOCATION(S) OF WORK:

1. Quiet Lake, Kusawa Lake, Klukshu River, Yukon River (at Whitehorse)
2. Fishing Branch River (near Old Crow)

SCHEDULE:

The burbot and lake trout samples will be collected in the spring (March/April) and the fall (September/October), respectively. For more information, please contact project leader directly.

CONTACT INFORMATION:

Project Leader: Mark Palmer
Yukon Contaminants Committee
Department of Indian Affairs and Northern Development (DIAND)
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345-300 Main Street
Whitehorse, Yukon
Y1A 2B5

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E-mail: palmerm@inac.gc.ca

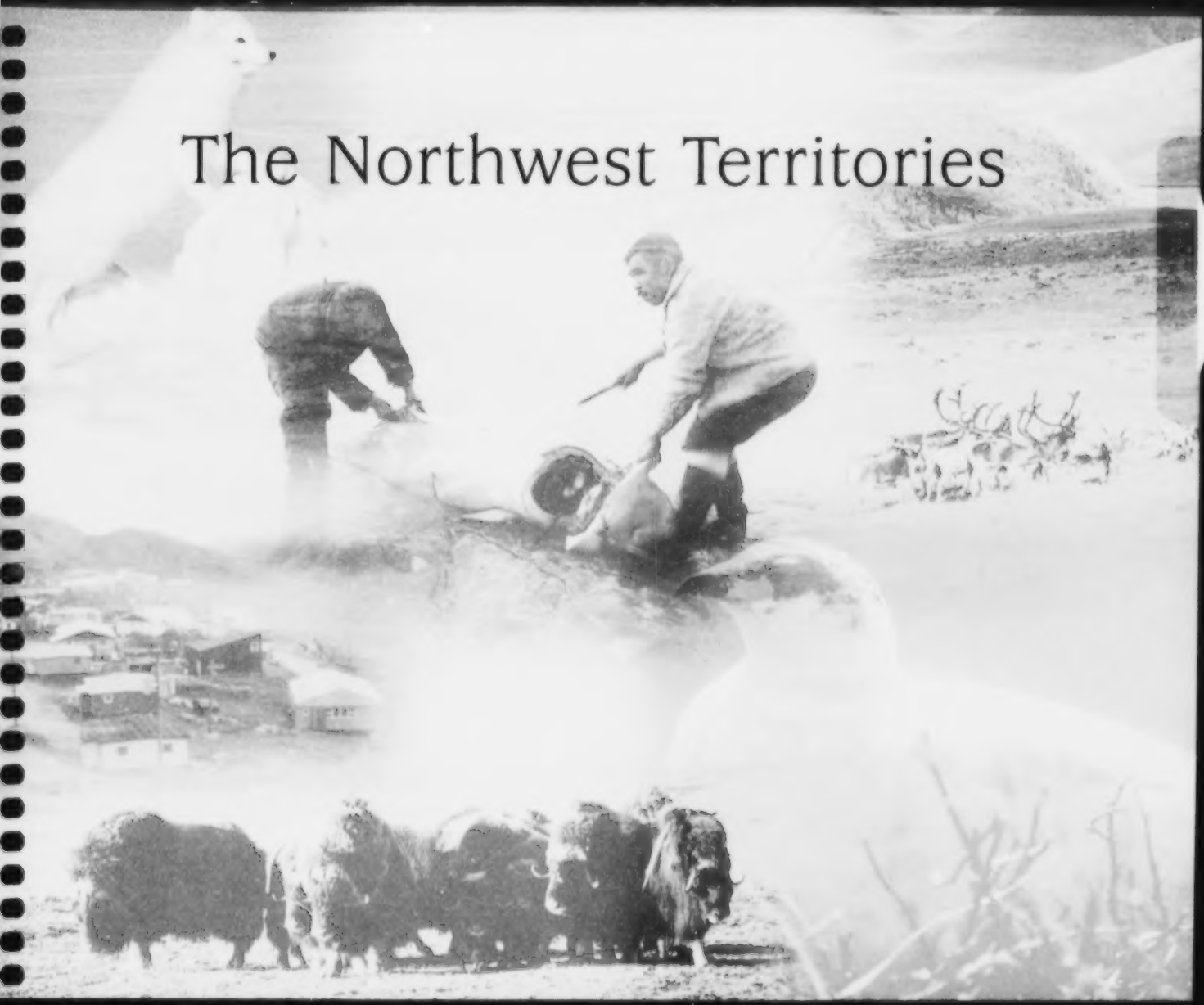
TIME FRAME:

April 1997 – March 2003. Results summaries will be provided to appropriate communities upon completion of the project. A report will be made available and presented at the Annual NCP Results Workshop.

RELATED PROJECTS:

Related projects include "Contaminants in Burbot from Fort Good Hope, Northwest Territories" page 42 in booklet, "Contaminants and Heavy Metals in Fish from Great Slave Lake and Slave River" page 48 in booklet, and "Temporal Trends of Persistent Organic Pollutants and Metals in Landlocked Char" page 70 in booklet.

The Northwest Territories



N.W.T.

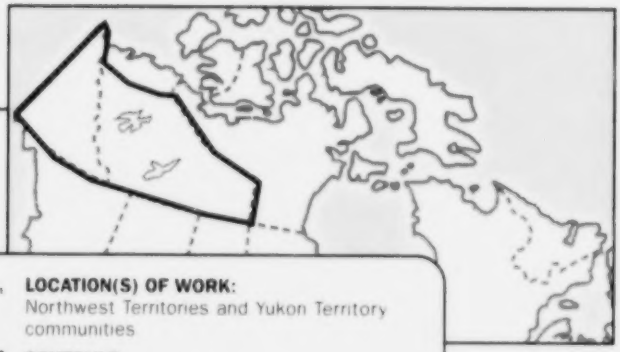
The Northwest Territories

Food Choice Decisions by Western Arctic Aboriginal Women and Children

Q What factors influence what Aboriginal women and children choose to eat?

RELEVANCE:
Individual decision-making is at the core of the discussions concerning benefits and risks of consuming traditional/country foods that contain **contaminants**. It is ultimately the decision of those living in the North to decide what foods, market and/or traditional/country, to consume. Information on contaminants in food is one of many factors influencing food choice decisions in the North. Other factors include taste, health status of individuals, cultural aspects, and cost. The importance of these factors varies among individuals. There is a need to identify the important food decision factors among people living in the North, particularly women and children, as women of childbearing age and children are more susceptible to the risks of contaminants.

PROJECT SUMMARY:
This project will determine the factors that influence what people choose to eat. It focuses on Aboriginal women and children in Dene, Métis and Yukon First Nation communities that have been part of the studies on dietary benefits and risks, conducted by the Centre for Indigenous Peoples' Nutrition and Environment (CINE). With an understanding of the factors that influence food choice, food education plans that explain food benefits and contaminant risks can be developed. Focus groups will develop a research interview tool that will be used to interview women and schoolchildren, aged 9-13 years, in 6 communities (90 interviews). The project will be conducted over two years in collaboration with the Council of Yukon First Nations (CYFN), Métis Nation-NWT, and Dene Nation.



LOCATION(S) OF WORK:
Northwest Territories and Yukon Territory communities

SCHEDULE:
The project will take place throughout the year. For more information, please contact the project leader directly.

CONTACT INFORMATION:
Project Leader: H.V. Kuhnlein
Centre for Indigenous Peoples' Nutrition and Environment (CINE)
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21-111 Lakeshore Rd.
Ste. Anne de Bellevue, Quebec
H9X 3V9

Phone: (514) 398-7757
Fax: (514) 398-1020
E-mail: kuhnlein@macdonald.mcgill.ca

TIME FRAME:
April 2000 – March 2002. Discussion and workshop results will be presented to the Métis Nation-NWT, Dene Nation, Council of Yukon First Nations, Yukon Health and Social Services Department and Government of Northwest Territories Health and Social Services Department. Preliminary results will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Contaminant Exposure and Nutritional Status: Socio-demographic Factors" page 106 in booklet, "Decision-Making and Inuit Traditional/ Country Foods: Balancing the Physical, Economic and Social Components (Year 2)" page 108 in booklet, and "Nutrient Benefits of Traditional/Country Food" page 122 in booklet.

Inuvik Regional Human Contaminants Monitoring Program

Q How will the results of the Inuvik Regional Human Contaminants Monitoring Program be communicated to Northerners?

RELEVANCE:

Northerners are exposed to **contaminants** through consumption of traditional/country foods. Therefore, the risks that contaminants in traditional/country food may have on human health need to be understood by Northerners. The Inuvik Regional Human Contaminants Monitoring Program has gathered information on the current contaminants levels in women and their newborn babies in the Inuvik region. Between June 1998 and June 1999, levels of contaminants **(persistent organic pollutants (POPs)**, **heavy metals** and **methylmercury)** in the blood and hair of pregnant women and the umbilical cord blood of their babies were measured. Also recorded were the types of traditional/country foods that the mothers ate, as well as other lifestyle factors, including smoking. These data will improve our ability to assess risks and enable us to monitor changes in contaminant levels over time.

PROJECT SUMMARY:

In this final year of the program, communication of the contaminants exposure data will be carried out on three different levels. First, confidential personal results will be made available to each participant. Secondly, the results of the monitoring program will be communicated to all communities. Finally, presentations will be made at different national and international conferences, such as the Canadian Institute of Public Health Inspectors Educational Conference, to increase the awareness of health effects of contaminants in the North. The results will be integrated into the territorial baseline for human contaminant exposure for all regions of the Northwest Territories and Nunavut, developed by the Government of the Northwest Territories (GNWT) Department of Health and Social Services and regional health boards.

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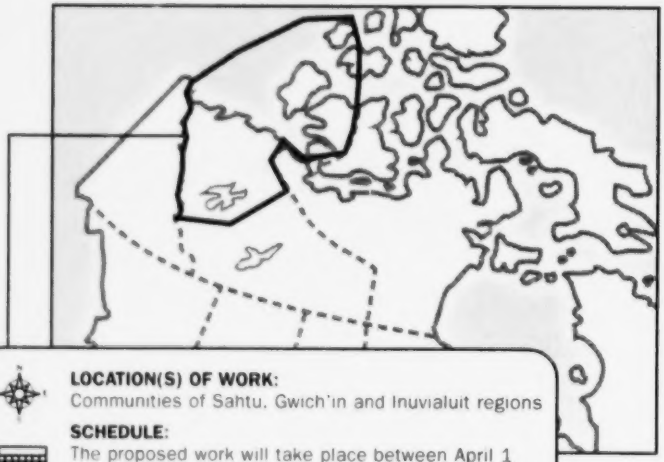


LOCATION(S) OF WORK:
Communities of Sahtu, Gwich'in and Inuvialuit regions

SCHEDULE:
The proposed work will take place between April 1 and October 1, 2000. For more information on this project, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Valoree Walker
c/o Inuvik Regional Health and
Social Services Board
Bag Service #2
Inuvik, Northwest Territories
X0E 0T0

Phone: (867) 777-4628
Fax: (867) 777-4264
E-Mail: valw@inuvik.net

TIME FRAME:
June 1997 – June 2000. A final results report will be printed for distribution to the participants and other interested agencies. The results of the project will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

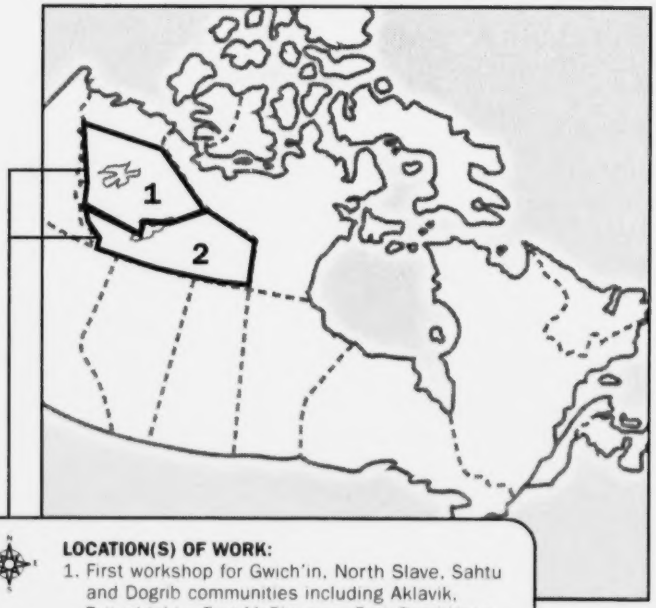
RELATED PROJECTS:
Related projects include "Dietary Exposure to Contaminants in Two Inuit Communities" page 60 in booklet, "The Effects of Prenatal Exposure of Persistent Organic Pollutants and Mercury on the Immune System of Inuit Infants (Year 3)" page 98 in booklet, and "Exposure of Preschool Aged Children to PCBs and Methylmercury" page 100 in booklet.

Frontline Training Course for Community Professionals: Métis Nation-NWT and Dene Nation

Q What is being done to ensure that key people at the community level have the training to deal with information on contaminants?

RELEVANCE:
The Frontline Training Course was developed for professionals working in northern communities who may be asked to deal with **contaminant** information as part of their work. As well as an overview of the **Northern Contaminants Program (NCP)** and its major findings to date, participants take part in a number of activities designed to show different ways of communicating contaminant information. The course also stresses the nutritional, economic and cultural aspects surrounding the issue of harvesting traditional/country food species.

PROJECT SUMMARY:
The Frontline Training Course for Community Professionals has been tested and delivered throughout a number of communities across the Northwest Territories (Aklavik and Yellowknife) and Nunavut (Iqaluit and the Kivalik region). The previously developed course manual will be reviewed and revised, as necessary, for delivery through workshops to frontline professionals from Métis and Dene communities. An assistant instructor from each region will be trained for course delivery. This will build the capacity of each region to address contaminants issues. Course participants will be provided with a basic understanding of contaminants issues and will learn how to access sources of information, expertise, and other resources. Participants will also gain an understanding of research methods which will help them to address and evaluate research proposals, identify potential opportunities for community involvement and communicate with scientists wishing to conduct work in their community.



LOCATION(S) OF WORK:

1. First workshop for Gwich'in, North Slave, Sahtu and Dogrib communities including Aklavik, Tsiigehtchic, Fort McPherson, Fort Good Hope, Colville Lake, Norman Wells, Tulita, Rae-Edzo, Rae Lakes, Snare Lake, Wha Ti and Yellowknife
2. Second workshop for South Slave and Deh Cho communities including Lutselk'e, Fort Smith, Hay River Reserve, Deninu Kue, Fort Liard, Fort Providence, Fort Simpson, Jean Marie River, Nahanni Butte, Trout Lake and Wrigley

SCHEDULE:
The project will be occurring throughout the year. For more information and workshop schedules, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Métis Nation – NWT
5125 50th Street
P.O. Box 1375
Yellowknife, Northwest Territories
X1A 2P1

Phone: (867) 873-3505
Fax: (867) 873-8851
E-mail: metisnwt@internorth.com

TIME FRAME:
April 2000 – March 2001.

RELATED PROJECTS:
Related projects include "Frontline Training for Community Professionals" page 4 in booklet, and "Frontline Training for Community Representatives in Labrador" page 110 in booklet.

Training and Support for Regional Contaminant Co-ordinators

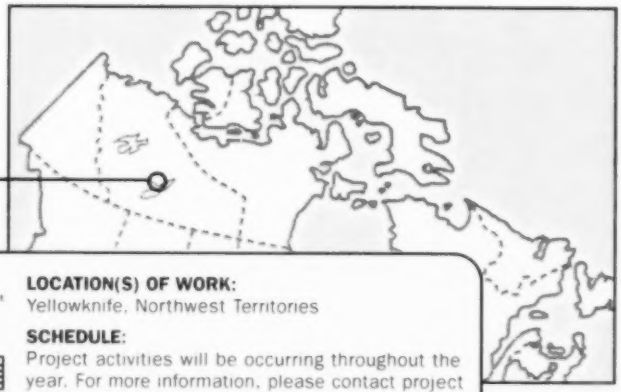
Q How can contaminants information be more effectively communicated to communities?

RELEVANCE:

An important commitment of the **Northern Contaminants Program (NCP)** is to improve the understanding of **contaminants** issues at the regional and community levels. An example of this is the creation of the Regional Contaminants Co-ordinator (RCC) position. RCCs are key resource people and are a crucial link in the communication between communities and the NCP. The RCCs have a lot of responsibility and therefore require appropriate training. They identify contaminant issues of concern for their regions, and ensure that these concerns receive attention under the NCP. This project offers guidance and support to RCCs who often work in isolation.

PROJECT SUMMARY:

The project offers an intense five-day training workshop for RCCs that builds on the expertise developed for the Frontline Training Program. Material covered at this workshop includes general contaminant information and specific research results, interpretation of charts and graphs, and the benefits and risks of consuming traditional/country food. Emphasis is placed on developing communication materials and on proposal writing and evaluation. The workshop also ensures that consistent messages on NCP research findings and projects are delivered by the RCCs, and provides an opportunity for discussion of local issues and for networking among RCCs. The RCCs will receive a manual which includes presentation materials and information on contaminants and the NCP.



LOCATION(S) OF WORK:
Yellowknife, Northwest Territories

SCHEDULE:
Project activities will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Métis Nation – NWT
5125 50th Street
P.O. Box 1375
Yellowknife, Northwest Territories
X1A 2P1

Phone: (867) 873-3505
Fax: (867) 873-8851
E-mail: metisnwt@internorth.com

TIME FRAME:
April 2000 – March 2001. The RCCs will prepare a presentation or poster on contaminant issues in their region for the Annual NCP Results Workshop.

RELATED PROJECTS:
Related projects include "Regional Contaminants Co-ordinator: Gwich'in Tribal Council" page 26 in booklet, "Regional Contaminants Co-ordinator: Inuvialuit Regional Corporation" page 28 in booklet, "Regional Contaminants Co-ordinator: Sahtu Contaminants Program" page 30 in booklet, "A Five Year Strategy of Communication and Action on Contaminants Issues in the Canadian Arctic" page 64 in booklet, and "Regional Contaminants Co-ordinator: Labrador Inuit Association" page 112 in booklet.

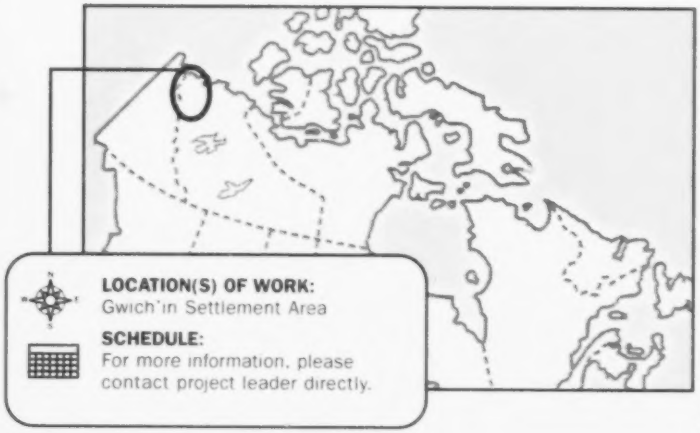
Regional Contaminants Co-ordinator: Gwich'in Tribal Council

Q How can we communicate information on contaminants research to Gwich'in communities?

RELEVANCE:
The Gwich'in, who rely heavily on traditional/country foods, have many concerns regarding **contaminants** in the **food chain** and the environment. Some of these concerns include the presence of **persistent organic pollutants (POPs)** and **heavy metals**, such as **mercury**, in caribou, fish and other wildlife used for food and their potential impacts on the animals and the health of people.

A Regional Contaminants Co-ordinator (RCC) would assist in providing residents of Gwich'in communities with information about risks from these contaminants, and means to reduce risks and exposures. An RCC would increase opportunities for the Gwich'in communities to become involved in the contaminants issue and assist them in making informed decisions about the food they eat.

PROJECT SUMMARY:
The RCC will communicate information on contaminants to the community members in the Gwich'in Settlement Area. This information will be delivered through individual discussions or through plain language presentations and workshops. The RCC will also assist communities to identify and prioritize contaminants issues, act as the co-facilitator to communicate community concerns and priorities to appropriate authorities and respond to local information requirements on contaminants related to traditional/country foods and to the health and safety of the environment. The RCC will also assist researchers with community consultations, with the negotiation of research agreements for funded projects, and with the reporting of project results to communities.



LOCATION(S) OF WORK:
Gwich'in Settlement Area

SCHEDULE:
For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Richard Nerysoo
Gwich'in Tribal Council
Box 1509
Inuvik, Northwest Territories
X0E 0T0

Phone: (867) 777-4869
Fax: (867) 777-4538
E-mail: rnerysoo@inuvik.net

TIME FRAME:
April 2000 – March 2001.

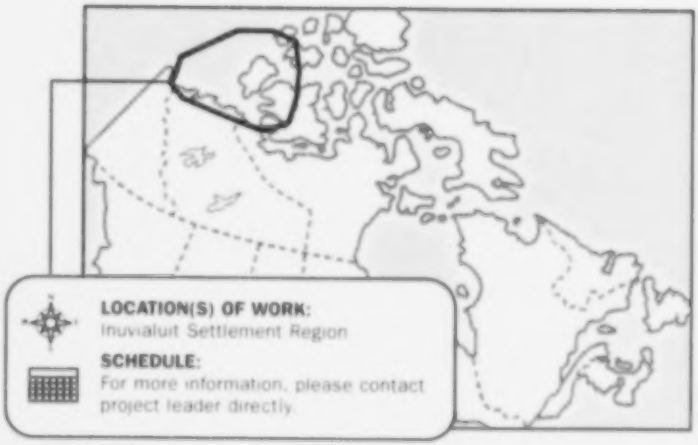
RELATED PROJECTS:
Related projects include "Training and Support for Regional Contaminant Co-ordinators" page 24 in booklet, "Regional Contaminants Co-ordinator: Inuvialuit Regional Corporation" page 28 in booklet, "Regional Contaminants Co-ordinator: Sahtu Contaminants Program" page 30 in booklet, and "Regional Contaminants Co-ordinator: Labrador Inuit Association" page 112 in booklet.

Regional Contaminants Co-ordinator: Inuvialuit Settlement Region

Q How can we better communicate information on contaminants research to communities within the Inuvialuit Settlement Region?

RELEVANCE:
Language and cultural differences have been major obstacles to effective communication in Inuvialuit communities. Promising communication strategies have now been developed at the community level and there has been increased communication at the regional and inter-regional levels. Reports on two major nutritional surveys and the Inuvik Regional Human Contaminants Monitoring Program will be made available in 2000 and it is important that this information be communicated throughout the Inuvialuit Settlement Region (ISR) in an effective and culturally appropriate manner. There is also a need for communication of information on sensitive and current contaminant issues such as **mercury** levels in beluga muktuk.

PROJECT SUMMARY:
The Regional Contaminants Co-ordinator (RCC) in the ISR will help Inuvialuit to understand more about contaminants and how they enter the **food chain** and affect wildlife and people. By doing so, the Inuvialuit will be able to ask questions and communicate concerns about contaminant issues as well as make informed decisions about the foods that they consume. The RCC will provide a focus for responding to questions and facilitating interactions within and between Inuvialuit communities, the **Northern Contaminants Program (NCP)**, and scientists. The RCC in the ISR will also help to communicate community concerns and priorities, with regards to contaminants, to decision-making bodies at the regional, national and international levels.



LOCATION(S) OF WORK:
Inuvialuit Settlement Region

SCHEDULE:
For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Nellie Cournoyea
Inuvialuit Regional Corporation
P.O. Box 2120
Inuvik, Northwest Territories
X0E 0T0

Phone: (867) 777-2737
Fax: (867) 777-2135
E-mail: info@irc.inuvialuit.com

TIME FRAME:
April 2000 – March 2001.

RELATED PROJECTS:
Related projects include "Inuvik Regional Human Contaminants Monitoring Program" page 20 in booklet, "Training and Support for Regional Contaminant Co-ordinators" page 24 in booklet, "Regional Contaminants Co-ordinator: Gwich'in Tribal Council" page 26 in booklet, "Regional Contaminants Co-ordinator: Sahtu Contaminants Program" page 30 in booklet, and "Regional Contaminants Co-ordinator: Labrador Inuit Association" page 112 in booklet.

Regional Contaminants Co-ordinator: Sahtu Contaminants Program

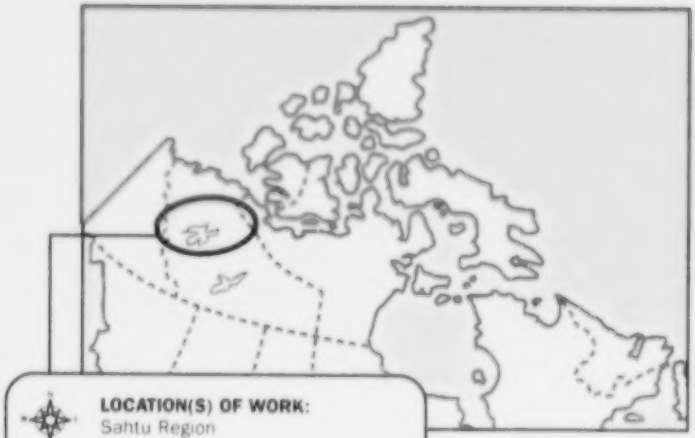
Q How will contaminants information be provided to Sahtu communities?

RELEVANCE:

Although some **contaminants** research has been conducted in the Sahtu Region, there is still a need for community participation to determine concerns and to develop community-based contaminants studies. It is important to have someone who can inform people at the local level about the latest information on contaminants, primarily through oral means, and particularly in the North Slavey language. This will help communities to play an increased role in identifying problems, determining priorities, and getting involved in contaminant research studies.

PROJECT SUMMARY:

A Regional Contaminants Co-ordinator (RCC) will be hired to help community members of the Sahtu understand more about contaminants and how they enter the **food chain** and affect wildlife and people. The RCC will communicate research information on contaminants and identify community concerns related to contaminants. A regional resource library containing information on past and current research projects will be established. This will help Sahtu community members determine the types of projects needed in the future. A regional workshop, attended by elders, translators and resource people, will be held to translate scientific and contaminants terminology and research summaries into North Slavey. A North Slavey dictionary for contaminants terminology will be developed based on workshop discussions.



LOCATION(S) OF WORK:
Sahtu Region

SCHEDULE:
Project activities will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Brian Davidson
Sahtu Secretariat
Sahtu Dene Council
Box 144
Deline, Northwest Territories
X0E 0G0

Phone: (867) 589-4719
Fax: (867) 589-4908

TIME FRAME:
April 2000 – March 2001.

RELATED PROJECTS:
Related projects include "Training and Support for Regional Contaminant Co-ordinators" page 24 in booklet, "Regional Contaminants Co-ordinator: Gwich'in Tribal Council" page 26 in booklet, "Regional Contaminants Co-ordinator: Inuvialuit Regional Corporation" page 28 in booklet, "A Five Year Strategy of Communication and Action on Contaminants Issues in the Canadian Arctic" page 64 in booklet, "Regional Contaminants Co-ordinator: Labrador Inuit Association" page 112 in booklet.

Contaminant Education Program for Northwest Territories and Nunavut Schools

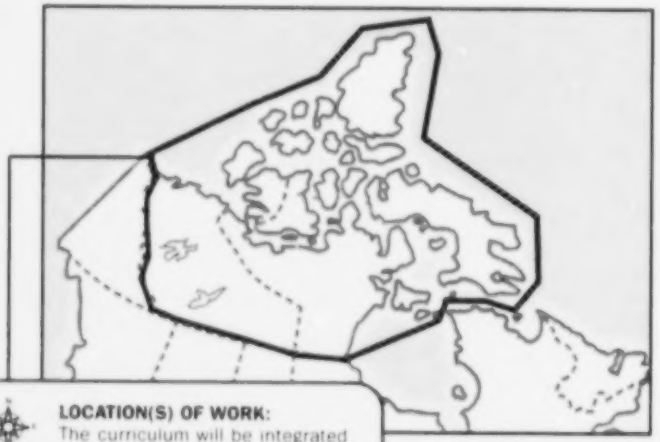
Q How can Northern young people learn more about contaminants issues?

RELEVANCE:

Young people receive science and environmental education through their school. **Contaminant** information can effectively be taught by integrating it into the existing science and environmental curricula. This enables teachers to use these materials, as part of their teaching requirements. The students will be able to identify with these materials as they are produced in the North and carry a Northern perspective. For example, by relating contaminant issues to existing curriculum documents on traditional knowledge (TK), students will learn about the contributions from both TK and western science.

PROJECT SUMMARY:

A Contaminant Education Program has been designed to integrate with the existing curricula for Northwest Territories and Nunavut schools and will be implemented in phases. The lesson plans and teacher reference materials can be used to fulfill the requirements of selected courses. The materials can be used as part of the regular school program and will continue to be used beyond the life of the **Northern Contaminants Program (NCP)**. Lesson plans and teacher manuals are available in hard copy and CD-ROM format. This year, the project will develop lesson plans for Social Studies Grades 7-9 and Northern Studies Grade 10 for Nunavut schools. Pilot testing and teacher in-service workshops will also be carried out.



LOCATION(S) OF WORK:
The curriculum will be integrated in schools throughout Northwest Territories and Nunavut.

SCHEDULE:
For more information on this project and previous work on the Contaminants Education Program, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Métis Nation – NWT
5125 50th Street
P.O. Box 1375
Yellowknife, Northwest Territories
X1A 2P1

Phone: (867) 873-3505
Fax: (867) 873-8851
E-mail: metisnwt@internorth.com

TIME FRAME:
April 1997 – March 2001. Pilot testing (practice testing) results from lesson plans for Social Studies Grades 7-9 and Northern Studies Grade 10 will be made available upon completion of the project.

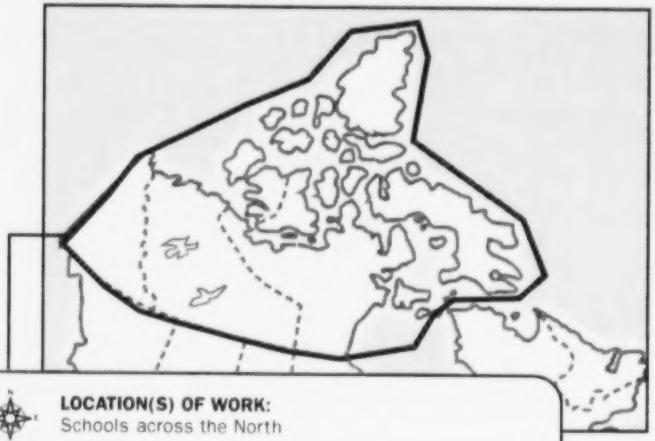
RELATED PROJECTS:
Related projects include "Northern Contaminants Poster Contest" page 34 in booklet, and "Video: Contaminants in the Canadian North" page 36 in booklet.

Northern Contaminants Poster Contest

Q How can Northern youth and children learn more about contaminants?

RELEVANCE:
Much research has been done in the North on **contaminants**. Although the **Northern Contaminants Program (NCP)** researchers have made considerable effort to communicate the results of such research to Northerners, the information may not be effectively communicated to the youth and children. A poster contest involving schools in the North will encourage students to learn about contaminants and, in their own words and illustrations, communicate a message about contaminants that can be distributed across the North and the rest of Canada.

PROJECT SUMMARY:
Students and teachers in the Yukon, Northwest Territories and Nunavut will receive information about contaminants in the North. With this information, students of all ages will design posters on contaminant issues and enter them in the Northern Contaminants Poster Contest. Schools in the three territories will submit the posters to the Council of Yukon First Nations (CYFN), the Métis Nation – NWT, the Dene Nation, or the Inuit Tapirisat of Canada (ITC). A working group composed of representatives from each of these aboriginal organizations will select the first, second and third place winners. The schools that provide the winning posters will receive $3,000 (first place), $2,000 (second place) and $1,000 (third place) worth of science-related materials. The winning posters will be printed and sent to schools across the North and to major centres across Canada. They will also be sent to Band Offices, Tribal Councils, museums and other locations across the North. This contest will provide teachers with an opportunity to introduce contaminants information to students and will provide students with an opportunity to share what they learn with others.



LOCATION(S) OF WORK:
Schools across the North

SCHEDULE:
The project will begin in September 2000 with the appropriate information being distributed to teachers. The deadline for accepting posters will be December 2000. Announcements regarding the winners will occur in March 2001. For more information, please contact project leaders directly.

CONTACT INFORMATION:
Project Leaders: Allison Armstrong
Dene Nation
P.O. Box 2338
Yellowknife, Northwest Territories
X1A 2P8

Phone: (867) 873-4081
Fax: (867) 920-2254
E-mail: dene-nation@ssimicro.com

Métis Nation-NWT
5125 50th Street
P.O. Box 1375
Yellowknife, Northwest Territories X1A 2P1

Phone: (867) 873-3505
Fax: (867) 873-8851
E-mail: metisnwt@internorth.com

Cindy Dickson
Council of Yukon First Nations
11 Nisutlin Drive
Whitehorse, Yukon Y1A 3S4

Phone: (867) 393-9214
Fax: (867) 668-6577
E-mail: ncp.cyfn@yukon.net

Scot Nickels
Inuit Tapirisat of Canada
170 Laurier Ave W.
Suite 510
Ottawa, Ontario K1A 5V5

Phone: (613) 238-8181
Fax: (613) 234-1991
E-mail: snickels@tapirisat.ca

TIME FRAME:
April 2000 – March 2001. This contest will take place in Fall/Winter 2000-2001.

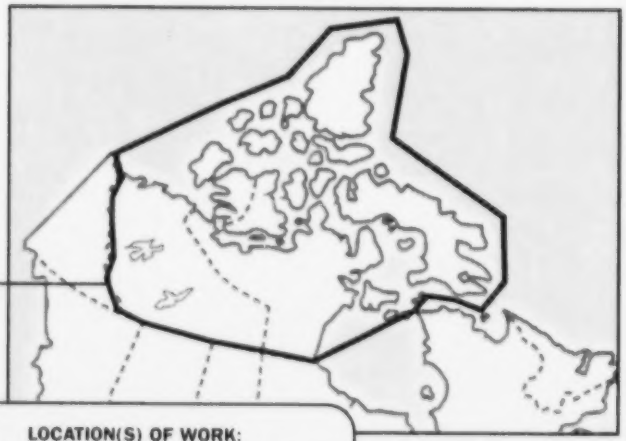
RELATED PROJECTS:
Related projects include "Contaminant Education Program for Northwest Territories and Nunavut Schools" page 32 in booklet, and ""Bear on Thin Ice" – Communication Through Fabric Art" page 38 in booklet.

Video: "Contaminants in the Canadian North"

Q How can Canadians learn more about the impact of contaminants on Northerners?

RELEVANCE:
Many southern Canadians believe the Arctic to be a vast region of pristine wilderness. However, the widespread presence of **contaminants** in the North and their effects on northern Aboriginal peoples' traditional/country food and lifestyle is important and speaks to the identity of all Canadians. In international meetings, other nations are moved by the implications of **long-range transport** of contaminants for northern Aboriginal peoples. The video produced in this project will increase awareness among the general public of contaminant issues. This increased awareness will strengthen Canada's international negotiating position on possible long-term solutions to long-range transport of contaminants to Canada's North.

PROJECT SUMMARY:
This project will involve Northerners, especially youth, in the production of a video, "Contaminants in Northern Canada". The video will tell the story of modern and traditional northern lifestyles, the importance of traditional/country food, and how scientific research has determined that human activities such as industry and agriculture in other parts of the world can affect the North. A camera and an information package will be brought to four or five participating community high schools throughout the year for students to develop specific themes and plans for the video. Other participants will include unemployed youth and science summer camp students. The video will be available to the organizations involved in its production, the Aboriginal People's Television Network and the **Northern Contaminants Program (NCP)**, as a communication tool for the public and at national and international gatherings. This project will build upon the Métis Nation's work in providing school curriculum materials and adult education courses such as the Frontline Training Project.



LOCATION(S) OF WORK:
A number of high schools in the Northwest Territories and Nunavut

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Métis Nation – NWT
5125 50th Street
P.O. Box 1375
Yellowknife, Northwest Territories
X1A 2P1

Phone: (867) 873-3505
Fax: (867) 873-8851
E-mail: metisnwt@internorth.com

TIME FRAME:
April 2000 – March 2001.

RELATED PROJECTS:
Related projects include "Contaminant Education Program for Northwest Territories and Nunavut Schools" page 32 in booklet, "Northern Contaminants Poster Contest" page 34 in booklet, and "Bear on Thin Ice" – Communication Through Fabric Art" page 38 in booklet.

"Bear on Thin Ice" – Communication through Fabric Art

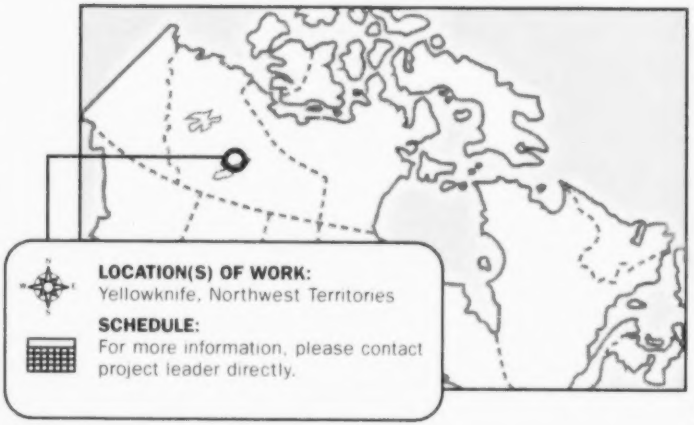
Q How can important messages about contaminants in the environment be communicated in a simple manner?

RELEVANCE:

Through the **Northern Contaminants Program (NCP)**, information on the accumulation of **contaminants** in the northern **ecosystems** and **food chains** has been passed on to communities in the North. The NCP has also provided sound evidence for the international negotiation process aimed at banning the global use of chemicals that produce these contaminants. There is an important need to communicate information on contaminants to northern Aboriginal people. A visual device, like a fabric art, could help in this communication. Northerners appreciate the time taken to work materials into a visual interpretation of their environment. They respect this time and effort as there are many aspects in their daily lives which require such effort.

PROJECT SUMMARY:

This project will produce a fabric wall hanging representing the Arctic marine food chain that supports the polar bear. It is hoped that this work of art will encourage discussion of contaminants concerns in the Arctic. Experience from working in cross-cultural situations has shown that non-verbal messages are often key to starting meaningful discussions. This quilt will travel to community meetings, national and international meetings, and NCP workshops and events.



LOCATION(S) OF WORK:
Yellowknife, Northwest Territories

SCHEDULE:
For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Métis Nation – NWT
5125 50th Street
P.O. Box 1375
Yellowknife, Northwest Territories
X1A 2P1

Phone: (867) 873-3505
Fax: (867) 873-8851
E-mail: metisnwt@internorth.com

TIME FRAME:
April 2000 – March 2001. The fabric wall hanging will be completed by March 2001.

RELATED PROJECTS:
Related projects include "Northern Contaminants Poster Contest" page 34 in booklet, and "Video: Contaminants in the Canadian North" page 36 in booklet.

Northwest Territories Environmental Contaminants Committee

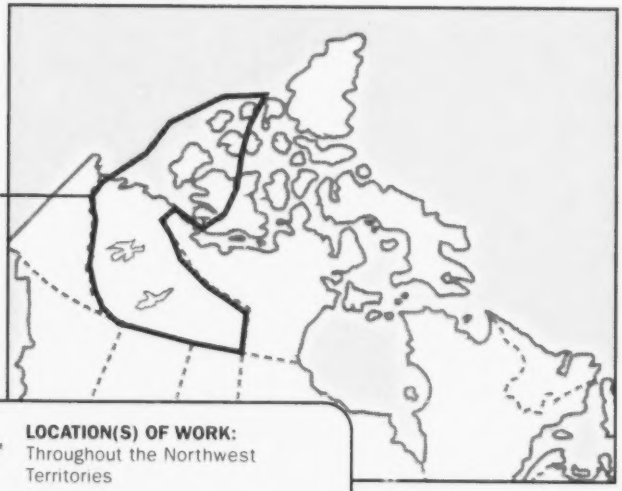
Q How can people in the Northwest Territories find out more about contaminants research and have opportunities to get involved in the Northern Contaminants Program?

RELEVANCE:

The **Northern Contaminants Program (NCP)** includes the participation of Northwest Territories communities and regions in research and communication efforts. This is done through the Northwest Territories Environmental Contaminants Committee (NWT ECC) where **contaminants** information and research initiatives are co-ordinated. The NWT ECC is composed of representatives from various departments in the federal and territorial governments as well as national and regional Aboriginal partners. Each representative is actively involved in either environmental or human health activities, which allows the committee to make decisions on most contaminant related issues. The NWT ECC also provides the opportunity for researchers and communities to provide input into contaminants activities. The Department of Indian Affairs and Norther Development (DIAND) Yellowknife office provides secretariat support and the chair to the NWT ECC, and supports a representative on the NCP Management Committee.

PROJECT SUMMARY:

The NWT ECC will promote scientific study and assessment, and communication of information to Northerners on the presence and possible effects of contaminants in air, land, water, fish, wildlife and humans. NWT ECC members will review all project proposals relating to the Northwest Territories for socio-cultural content, as well as all Northwest Territories-based communications initiatives. The NWT ECC will continue to develop a communications network, which will make sure that people are informed and involved in contaminants activities. The DIAND Yellowknife Secretariat will continue to act as a clearinghouse of environmental contaminants information. Both the communications network and the DIAND resource centre will help transfer contaminants information among Northwest Territories Northerners, researchers, the NCP, and other contaminants related programs. Several committee meetings will take place this year, and the summary notes of each meeting will be available upon request. The Committee will also continue to support the newly formed Nunavut Environmental Contaminants Committee.



LOCATION(S) OF WORK:
Throughout the Northwest Territories

SCHEDULE:
For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Carole Mills
Contaminants Division
Department of Indian Affairs and Northern Development (DIAND)
Northwest Territories Region
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X1A 2R3

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TIME FRAME:
April 2000 – March 2001. Reports and minutes from meetings and a year-end report of activities will be made available.

RELATED PROJECTS:
Related projects include "Yukon Contaminants Committee Communications Program" page 10 in booklet, "Nunavut Environmental Contaminants Committee" page 68 in booklet, and "Co-ordination and Administration of the Northern Contaminants Program" page 128 in booklet.

Contaminants in Burbot from Fort Good Hope, Northwest Territories

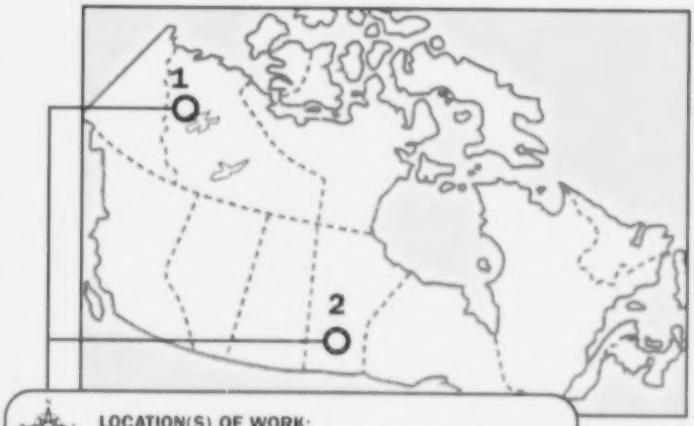
Q Are the levels of persistent organic pollutants and heavy metals in burbot from Fort Good Hope changing over time?

RELEVANCE:

Little is known about levels of **persistent organic pollutants (POPs)** and **heavy metals** in fish in Arctic marine and freshwater environments or about any changes that might be occurring in these levels over time. Much of the information that is available has limited scientific value because it is based on too few samples. Therefore, there is a need for a well-designed study on changes in **contaminant** levels over time at one location where much information already exists on contaminants, fish and the environment. Burbot, a predatory bottom-feeding fish species, is suitable for monitoring contaminants because it does not change its location in a lake or river and has a high fat content in the liver (contaminants tend to accumulate in fat). As well, data exists from previous studies for POPs in burbot livers and for **mercury**, **selenium** and **arsenic** in muscle and liver of burbot from the Fort Good Hope area.

PROJECT SUMMARY:

This project will study changes over time in levels of POPs, such as **organochlorines** and **organobromines**, and heavy metals (mercury, selenium, arsenic) that **bioaccumulate** in livers of burbot from the Fort Good Hope area. The livers of 20 burbot from the Mackenzie River at Rampart Rapids will be collected in the late fall or early winter and analyzed. These analyses will determine if contaminant levels in burbot are increasing or decreasing over time. These results will also test the effectiveness of international controls in reducing inputs of contaminants to the North.



LOCATION(S) OF WORK:
1. Fort Good Hope area, Northwest Territories
2. Freshwater Institute, Winnipeg, Manitoba

SCHEDULE:
Samples will be collected in late fall or early winter. For more information, please contact project leaders directly.

CONTACT INFORMATION:
Project Leaders: Gary Stern and Lyle Lockhart
Freshwater Institute
Department of Fisheries and Oceans
501 University Cr.
Winnipeg, Manitoba
R3T 2N6

Phone: (204) 984-6761 (Gary Stern)
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lockhartl@dfo-mpo.gc.ca

TIME FRAME:
April 1999 – March 2003. Preliminary results will be made available to the residents of Fort Good Hope, and presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Yukon Traditional/Country Foods Monitoring Program" page 12 in booklet, "Mercury in Fish from Lakes in the Western Northwest Territories" page 44 in booklet, "Mercury in Predatory Fish in the Mackenzie River Basin" page 46 in booklet, "Contaminants and Heavy Metals in Fish from Great Slave Lake and Slave River" page 48 in booklet, and "Temporal Trends of Persistent Organic Pollutants and Metals in Landlocked Char" page 70 in booklet.

Hg

Mercury in Fish from Lakes in the Western Northwest Territories

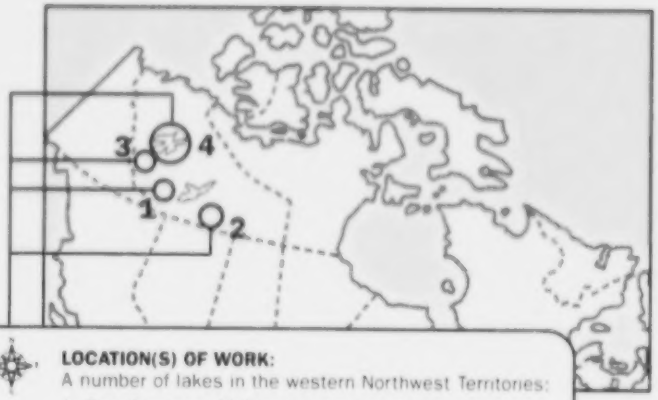
Q What are the factors affecting mercury levels in fish from western Northwest Territories lakes that are important to subsistence fishing?

RELEVANCE:

Mercury levels recorded in Arctic marine mammals and lake sediments in the Northwest Territories suggest that the amount of mercury transported mainly through the atmosphere to northern Canada has increased. Mercury levels in larger fish from some Northwest Territories lakes may exceed levels recommended for human consumption, and those fish feeding near the top of the **food chain** (walleye, pike, lake trout) often contain levels high enough to require **food consumption advisories** from health authorities. Most mercury in fish is present in the **toxic** form as **methylmercury**. Studies have shown that **selenium** in fish is effective in protecting against methylmercury poisoning. Analyzing for levels of selenium, as well as mercury in fish tissues, could be useful in future **risk assessments**. Given these considerations, it is important to assess levels of mercury and selenium in fish harvested now, or in those fish that have potential for future harvest.

PROJECT SUMMARY:

This project will investigate the presence and geographic distribution of mercury, selenium and **arsenic** in fish from lakes in the western Northwest Territories. The overall purpose is to develop a management strategy for recommending the amount of fish that people can eat based on species and size of fish on a lake-by-lake basis. Sampling will be conducted on selected lakes following community meetings. This project will survey several lakes, with three fish species from each lake being sampled.



LOCATION(S) OF WORK:
A number of lakes in the western Northwest Territories:

1. Fort Simpson (McEwan and Reade lakes)
2. Jean Marie River (Deep and McGill lakes)
3. Norman Wells (Alfred Lennie Lake)
4. The Sahtu Region (Colville, Aubry and Belot lakes)

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:
Project Leaders: Lyle Lockhart
Freshwater Institute
Department of Fisheries and Oceans
501 University Cr.
Winnipeg, Manitoba
R3T 2N6

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Phone: (204) 983-7113
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E-mail: lockhartl@dfo-mpo.gc.ca

Marlene Evans
National Hydrology Research Institute
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Phone: (306) 975-5310
Fax: (306) 975-5143
E-mail: marlene.evans@ec.gc.ca

TIME FRAME:
April 1998 – March 2001. Community meetings will be held in Fort Simpson, Jean Marie River and Norman Wells as soon as possible once results have been obtained. A report will be made available upon completion of the project and preliminary results will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Yukon Traditional/Country Foods Monitoring Program" page 12 in booklet, "Contaminants in Burbot from Fort Good Hope, Northwest Territories" page 42 in booklet, "Mercury in Predatory Fish in the Mackenzie River Basin" page 46 in booklet, "Contaminants and Heavy Metals in Fish from Great Slave Lake and Slave River" page 48 in booklet, and "Temporal Trends of Persistent Organic Pollutants and Metals in Landlocked Char" page 70 in booklet.

Hg

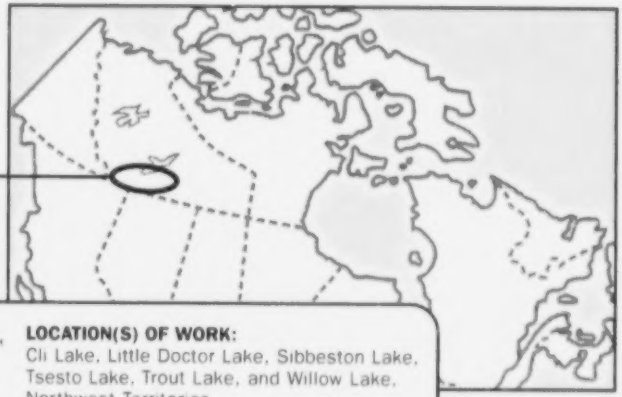
Mercury in Predatory Fish in the Mackenzie River Basin

Q What are the factors affecting high mercury levels in predatory fish in the Mackenzie River Basin?

RELEVANCE:
Fish are an important natural resource for communities living in the Mackenzie River Basin. They are important for subsistence fisheries and in maintaining cultural values in the North. Studies have revealed that there are large lake-to-lake variations in **mercury** levels in predatory (fish-eating) fish, particularly in the Mackenzie River Basin. Mercury levels may be high in some lakes due to inputs from inflowing streams and/or the air. Mercury levels may also be high because of natural characteristics of some of the lakes (and streams), which change mercury into a form that can be absorbed by plants and animals. Therefore, high mercury levels may be a naturally occurring feature of these lakes or they may be due to a more recent event like **long-range transport** through the atmosphere from sources outside the Arctic. This study is designed to investigate what characteristics of lakes are most important for determining mercury levels.

PROJECT SUMMARY:
This study investigates why predatory fish such as pike, walleye and lake trout in some lakes in the Mackenzie River Basin have high concentrations of mercury in their tissues. Studies of these lakes will determine lake depth, nutrient levels, and the types of plants and animals that live there. These studies will allow researchers to better investigate the factors affecting high mercury concentrations in predatory fish. Most of the work is being done at Cli Lake, west of Fort Simpson. Lake trout in this lake have very high mercury levels. Little Doctor Lake, where mercury levels are high in pike and walleye, is also being investigated. Cli Lake has very clear water while Little Doctor Lake has tea-coloured water. Water colour, through chemical reactions, may affect how much mercury enters and stays in the lake. Mercury concentrations in Tsetso Lake and Sibbeston Lake, which drain into Little Doctor Lake, and Trout Lake will also be studied.

Hg



LOCATION(S) OF WORK:
Cli Lake, Little Doctor Lake, Sibbeston Lake, Tsesto Lake, Trout Lake, and Willow Lake, Northwest Territories

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:
Project Leaders: Marlene Evans
National Water Research Institute
Environment Canada
11 Innovation Boulevard
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S7N 3H5

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Winnipeg, Manitoba
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E-mail: lockhartl@dfo-mpo.gc.ca

TIME FRAME:
April 1998 – March 2003. A progress report will be submitted to Fort Simpson each year and a final report will be prepared after all field sampling and laboratory analyses are complete. A preliminary report will be made available and presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Yukon Traditional/Country Foods Monitoring Program" page 12 in booklet, "Contaminants in Burbot from Fort Good Hope, Northwest Territories" page 42 in booklet, "Mercury in Fish from Lakes in the Western Northwest Territories" page 44 in booklet, "Contaminants and Heavy Metals in Fish from Great Slave Lake and Slave River" page 48 in booklet, and "Temporal Trends of Persistent Organic Pollutants and Metals in Landlocked Char" page 70 in booklet.

Contaminants and Heavy Metals in Fish from Great Slave Lake and Slave River

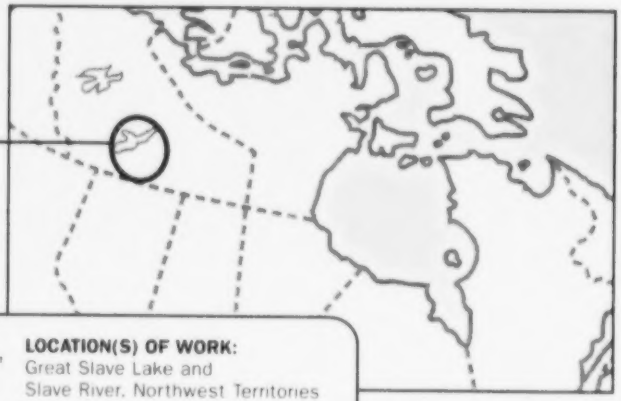
Q What are the changes in the levels of persistent organic pollutants and heavy metals in fish species of Great Slave Lake and the Slave River?

RELEVANCE:

The **contaminant** levels in fish species in different areas of the Northwest Territories and Mackenzie River Basin and the changes in those levels over time are not well known. Therefore, a long-term **biomonitoring** program is needed to determine contaminant trends and distribution. Fish are thought to be the best organisms for the biomonitoring of contaminant trends in freshwater environments. Great Slave Lake and the Slave River have been selected as study sites for the long-term biomonitoring of **organic** and **inorganic** contaminant trends in the Mackenzie River Basin. The reasons for selecting the Great Slave Lake area are the availability of results from previous studies of contaminants in the area, the availability of **archived** fish samples collected during these studies, and general knowledge about the local water system and the fish ecology.

PROJECT SUMMARY:

This study will sample burbot, pike, and lake trout from the Great Slave Lake and Slave River area. From the Slave River, burbot will be sampled at Fort Smith. In Great Slave Lake, burbot and pike will be sampled in the East Arm offshore of Lutsel K'e and in Resolution Bay, offshore of Fort Resolution. Lake trout will be collected in the East Arm offshore of Lutsel K'e and in the west basin of the Great Slave Lake from the commercial fisheries. Length, age, weight, lipid (fat) content, sex, condition, and carbon and nitrogen stable isotopes will be determined for each fish sampled. **Persistent organic pollutants (POPs)**, such as **PCBs**, coplanar PCBs, **DDT**, and **toxaphene**, and **heavy metals**, such as **selenium** and **arsenic**, will be analyzed. Archived samples will be re-analyzed to improve the quality and quantity of existing data sets.



LOCATION(S) OF WORK:
Great Slave Lake and
Slave River, Northwest Territories

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Marlene Evans
National Water Research Institute
Environment Canada
11 Innovation Boulevard
Saskatoon, Saskatchewan
S7N 3H5

Phone: (306) 975-5310
Fax: (306) 975-5143
E-mail: marlene.evans@ec.gc.ca

TIME FRAME:
April 1999 – March 2003. Results will be prepared in a progress report which will be made available to communities each year. A report will be made available and presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Yukon Traditional/Country Foods Monitoring Program" page 12 in booklet, "Contaminants in Burbot from Fort Good Hope, Northwest Territories" page 42 in booklet, "Mercury in Fish from Lakes in the Western Northwest Territories" page 44 in booklet, "Mercury in Predatory Fish in the Mackenzie River Basin" page 46 in booklet, and "Temporal Trends of Persistent Organic Pollutants and Metals in Landlocked Char" page 70 in booklet.

Heavy Metals and Radionuclide Contaminants in Caribou

Q Are the levels of heavy metals and radionuclides in caribou changing, and are they having any effects on the caribou's health?

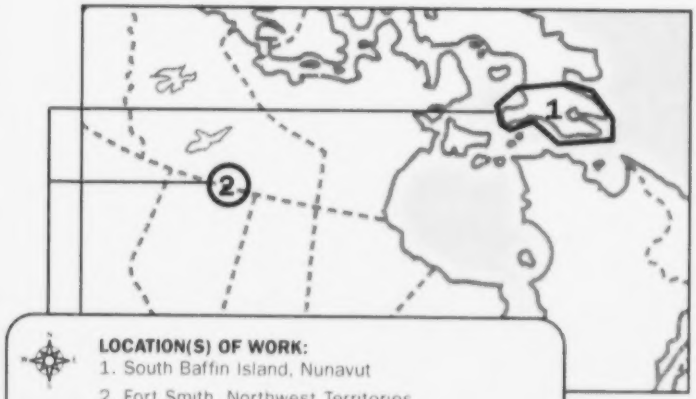
RELEVANCE:

Barren-ground caribou are found across northern Canada and are a major component of the traditional diet in communities across the Northwest Territories and Nunavut. Caribou are a good indicator species for terrestrial **ecosystem** contamination given their wide distribution across northern Canada, their simple air-lichen-caribou **food chain**, and their importance as a traditional/country food species. Because of their diet and long-lived nature, caribou can accumulate significant levels of **heavy metals**, which has implications for both caribou health and human consumption.

Until recently, information on heavy metal and **radionuclide contaminants** in caribou in the Canadian Arctic and subarctic regions was extremely limited, and data on trends over time were nonexistent. However, during the 1990s levels of heavy metal and radionuclide contaminants in caribou tissues from major barren-ground herds across the Northwest Territories were assessed and a wide range of contaminants was detected. This provided a good baseline to assess current exposure and to serve as a comparison for changes in contaminant levels in the future.

PROJECT SUMMARY:

Three caribou herds (Baffin Island, Beverly and Bluenose) from across the Northwest Territories and Nunavut have been selected for study and monitoring, with a different herd sampled each year. The Beverly herd was sampled this year on its winter range east of Fort Smith, Northwest Territories. This location was selected for ease of access to the herd in late winter, and to compare biological and contaminant data collected at the same location in the 1970s and 1980s. These samples will also be used to determine heavy metal and radionuclide contaminant levels in this important traditional/country food species and to determine if these levels are increasing, decreasing or remaining the same over time. Field collections will be planned and conducted in co-operation with local organizations of hunters and trappers and/or local aboriginal organizations.



LOCATION(S) OF WORK:
1. South Baffin Island, Nunavut
2. Fort Smith, Northwest Territories

SCHEDULE:
1. Sampling of the south Baffin herd took place in March 1999 with the assistance of the community of Kimmirut.
2. The Beverly herd was sampled in March 2000.

Analysis of the data will be done in 1999-2000; sampling of the north Baffin and Bluenose herds will be done in subsequent years.

For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Brett Elkin
Resources, Wildlife and Economic Development
Government of Northwest Territories
600, 5102 50th Avenue
Yellowknife, Northwest Territories
X1A 3S8

Phone: (867) 873-7761
Fax: (867) 873-0293
E-mail: brett_elkin@gov.nt.ca

TIME FRAME:
April 1997 – March 2003. Upon completion of the project, results will be presented to the participating communities. All print information (summary reports and posters) will be provided in English and Inuktitut. A report will be produced and presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Persistent Organic Pollutants and Heavy Metals in Canadian Arctic Fox" page 76 in booklet.

Contaminants in Canadian Arctic Beluga

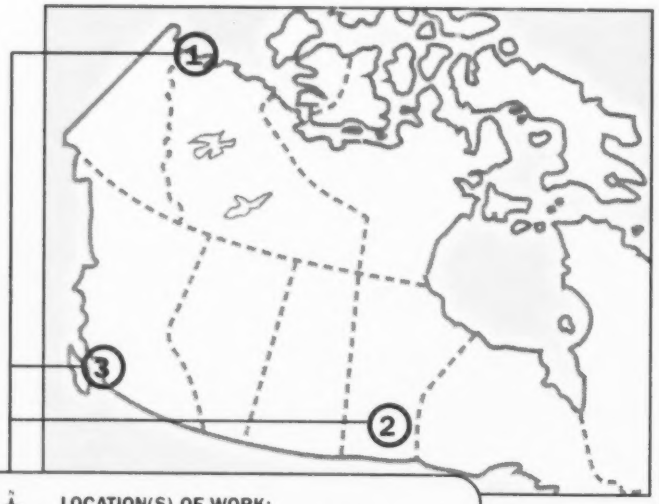
Q What are the trends of persistent organic pollutants in Canadian Arctic beluga over time?

RELEVANCE:

Limited information exists on "current use" **persistent organic pollutants (POPs)** in the Canadian Arctic. **Polybrominated biphenyls (PBBs)** and **brominated diphenyl ethers (BDPEs)** are found in plastic materials and used as flame retardants in many products and are similar in behaviour and **toxicity** to other environmental **contaminants**, such as **PCBs** and **DDT**. Over the past two decades, the current use of these chemicals has increased substantially. As a result, PBBs and BDPEs have been released into the environment. Both groups of chemicals are expected to **bioaccumulate**. BDPEs have been detected at low concentrations in ringed seal (near Pangnirtung) and beluga (near Kimmirut) blubber samples from southeast Baffin Island. The presence of BDPEs in these samples is clear evidence for **long-range transport** through the atmosphere to the Arctic as there are no significant sources for these contaminants in the Arctic. A study of the changes in the levels of these contaminants over time will help in assessing the potential risk of exposure to them. To date, no data exist, including temporal trend data, for these "current use" chemicals in Canadian Arctic marine mammals.

PROJECT SUMMARY:

This project will study the changes in levels of PBBs, BDPEs and a number of other POPs in Arctic marine **ecosystems** over time. This year, blubber samples from 15 to 20 male beluga will be collected from western Arctic animals (Kugmallit Bay, Hendrickson Island) and analyzed for contaminants. As well, **archived** beluga blubber samples from previous years will be analyzed for additional POPs. These results will help determine whether contaminant levels in these animals, and thus exposure to people living in Arctic communities who consume them as part of their traditional diet, are increasing or decreasing over time.



LOCATION(S) OF WORK:
1. Kugmallit Bay, Hendrickson Island
2. Freshwater Institute, Winnipeg, Manitoba
3. Institute of Ocean Sciences, Sidney, British Columbia

SCHEDULE:
Samples will be collected this year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Gary Stern
Freshwater Institute
Department of Fisheries and Oceans
501 University Cr.
Winnipeg, Manitoba
R3T 2N6

Phone: (204) 984-6761
Fax: (204) 984-2403
E-mail: sterng@dfo-mpo.gc.ca

TIME FRAME:
April 2000 – March 2001. Results of this project will be communicated to northern communities and presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Temporal Trends of Persistent Organic Pollutants and Metals in Ringed Seals and Walrus from the Canadian Arctic" page 80 in booklet, "Temporal Trends of Mercury in Beluga, Narwhal, and Walrus from the Eastern Arctic" page 82 in booklet, and "New Persistent Chemicals in the Arctic Environment" page 92 in booklet.

Persistent Organic Pollutants in the Canada Basin of the Arctic Ocean

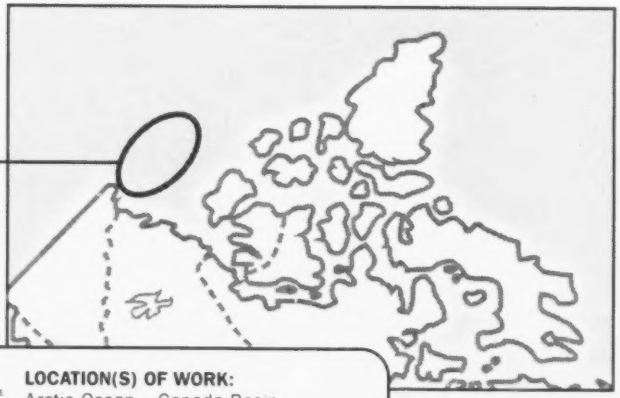
Q What is the behaviour of persistent organic pollutants in the water and ice of the Canada Basin in the Arctic Ocean?

RELEVANCE:

In September 1997, a Canadian Coast Guard icebreaker, the *CCGS Des Groseillers*, was frozen into a permanent ice pack in the Canadian Arctic. This started a year long program of scientific data sampling as the ship drifted across the southern Canada Basin. Samples of **biota**, water air and ice that showed oceanographic and biological conditions along the drift path of the ship were collected. The results of the analyses of these samples for **persistent organic pollutants (POPs)** will help scientists understand how the **contaminants** arrive in the upper ocean, how they are carried out from the upper ocean and how they enter the **food web**. Scientists will analyze these data to look for any link between the arrival of contaminants at the surface and their entry into the food web during polar sunrise. The results may determine how much of the contaminant that gets into the biota comes from that year's **fallout** and how much is left over fallout from previous years. This aspect is very important in understanding how the ocean biota will respond to international controls of POPs.

PROJECT SUMMARY:

The work to be done this year represents the final phase of the project. It involves combining all the data into a large data-set, and the analysis of the data through statistical models. Outstanding analysis of **toxaphene** concentrations in water and POP concentrations in ocean sediments will be completed. The completed data-set and its analysis will allow the contaminant data to be understood in relation to the combination of chemical and physical processes and the food web structure.



LOCATION(S) OF WORK:
Arctic Ocean – Canada Basin

SCHEDULE:
For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Robie Macdonald
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V8L 4B2

Phone: (250) 363-6409
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E-mail: macdonaldr@pac.dfo-mpo.gc.ca

TIME FRAME:
April 1997 – March 2001. Results will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

Nunavut

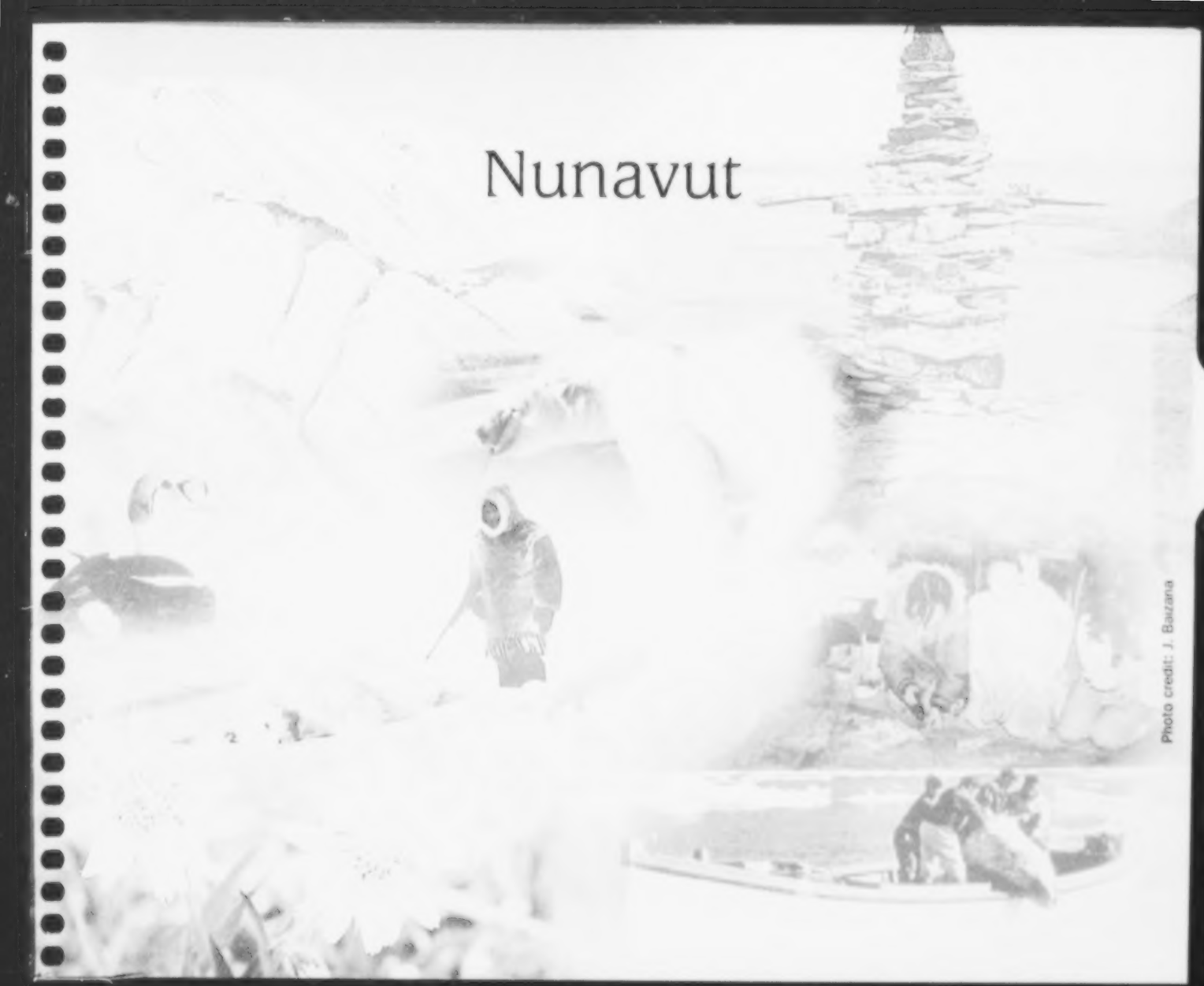


Photo credit: J. Bazana

Nunavut

Dietary Exposure to Contaminants in Two Inuit Communities

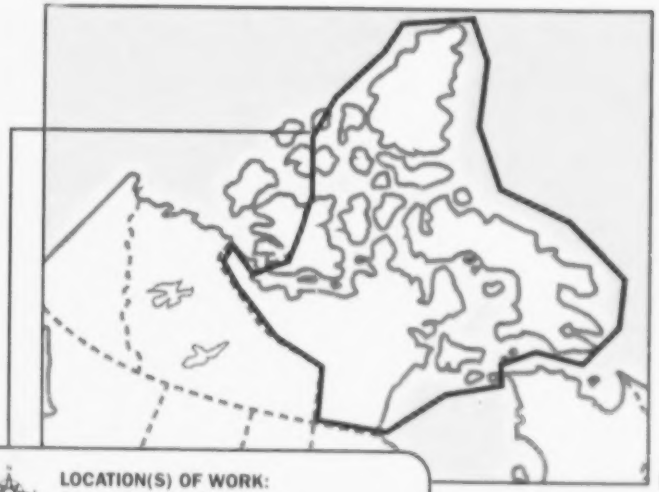
Q What is the exposure to contaminants through the consumption of traditional/ country food?

RELEVANCE:

Over the last ten years, there has been considerable effort to monitor the levels of **contaminants** in fish and wildlife collected from different regions in northern Canada. As a result, a database with information on contaminants of concern in many species of fish and wildlife, particularly those species that are important food sources for Northerners, has been established. Through workshops conducted in 1997 and 1998 in five regions in the North (Inuvialuit, Kitikmeot, Kivalik, Baffin and Labrador), the commonly consumed food items in each region were identified. The existing contaminants data along with dietary information, collected through a dietary survey conducted by the Centre for Indigenous Peoples' Nutrition and Environment (CINE) in the Northwest Territories and Nunavut, will be used to assess the exposure of Northerners to contaminants through food consumption.

PROJECT SUMMARY:

This project will estimate the dietary exposure of residents in two Inuit communities to contaminants. Samples of traditional/ country food that are the major contributors of contaminant intake will be collected from these communities and analyzed for contaminants. The level of contaminants that Inuit are exposed to through their diet will be estimated by combining the contaminant concentrations in food with the information on how much of these foods people actually eat. The estimated risk from exposure to contaminants through traditional/ country food will be determined and communicated to these communities.



LOCATION(S) OF WORK:
Communities in Nunavut

SCHEDULE:
The project will be occurring throughout the year. For more information about the project and on the communities selected for this study please contact the project leader directly.

CONTACT INFORMATION:
Project Leader: Laurie H.M. Chan
Centre For Indigenous Peoples' Nutrition and Environment (CINE)
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Ste-Anne-de-Bellevue, Quebec
H9X 3V9

Phone: (514)398-7765
Fax: (514) 398-1020
E-mail: Chan@macdonald.mcgill.ca

TIME FRAME:
April 2000 – March 2001. Preliminary results will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

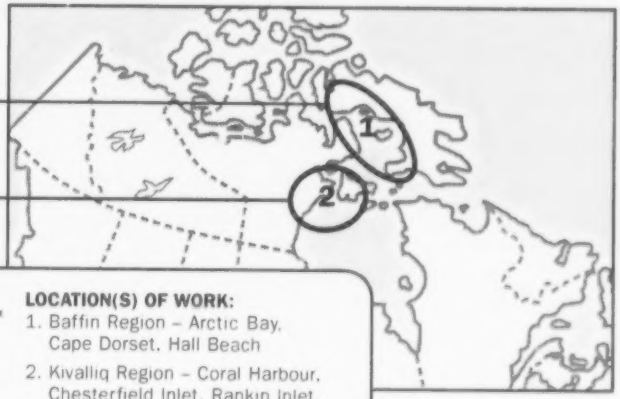
RELATED PROJECTS:
Related projects include "Exposure of Preschool Aged Children to PCBs and Methylmercury" page 100 in booklet, "PCBs and Infant Development" page 102 in booklet, and "Decision-Making and Inuit Traditional/Country Foods: Balancing the Physical, Economic and Social Components (Year 2)" page 108 in booklet.

Eastern Arctic Contaminants Tour (Phase II)

Q What can be done to better communicate contaminant information to Eastern Arctic communities?

RELEVANCE:
An effective way to communicate **contaminant** research results and information about the **Northern Contaminants Program (NCP)** is to have a small, knowledgeable team of experts spend a few days in a community discussing contaminants and related information with community members. The advantages of hosting workshops in communities are that more community members can be reached and they will hear the message from a source who can answer their questions immediately. Community members may feel more free to ask questions and raise concerns about contaminants as they are with their families and neighbours. This approach will also strengthen relationships between community members and NCP representatives, particularly scientists.

PROJECT SUMMARY:
Several communities in the Baffin and Kivalliq regions of Nunavut will be visited by a team consisting of an NCP representative, an Aboriginal partner, a health specialist and a scientist. These communities are: Arctic Bay, Hall Beach and Cape Dorset (Baffin), and Coral Harbour, Chesterfield Inlet, Rankin Inlet, Whale Cove and Arviat (Kivalliq). The purpose of these visits is to communicate the goals and priorities of the NCP, to discuss current contaminant projects in the area, to listen to the concerns of Nunavut communities about contaminants in the environment, and to assist communities in making informed decisions about the consumption of traditional/country foods. Prior to each visit, a community liaison person will be hired to help organize meetings and events, and to provide a point of contact for any further work. The team will also take advantage of the time in the community to meet with the Hunters and Trappers organizations, the Hamlet Council, the schools and any interested groups. A trip report will be prepared outlining the comments and concerns raised at each community.



LOCATION(S) OF WORK:
1. Baffin Region – Arctic Bay, Cape Dorset, Hall Beach
2. Kivalliq Region – Coral Harbour, Chesterfield Inlet, Rankin Inlet, Whale Cove, Arviat

SCHEDULE:
Communities will be visited between September and December 2000. For more information, please contact project leaders directly.

CONTACT INFORMATION:
Project Leaders: Glen Stephens
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X1A 2R3

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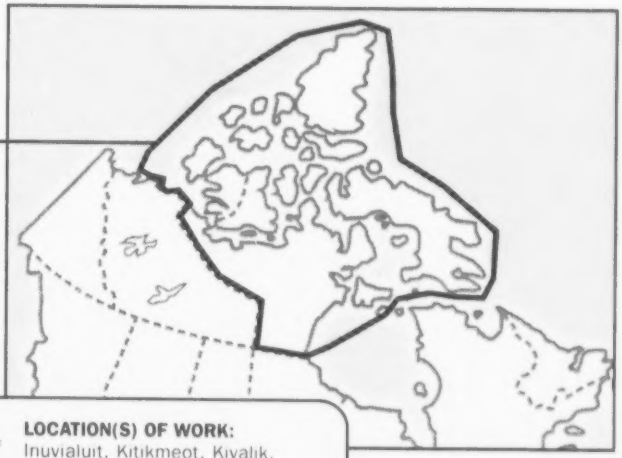
TIME FRAME:
April 1999 – March 2001. A report summarizing the results workshops will be produced upon completion of the project.

A Five Year Strategy of Communication and Action on Contaminants Issues in the Canadian Arctic

Q How is information on contaminants being communicated to Inuit at the community level?

RELEVANCE:
At the Eastern Arctic Contaminant Workshop in Iqaluit in December 1998, an urgent need for more Regional Contaminant Co-ordinators (RCCs) to help with communication in the diverse regions of Inuvialuit, Kitikmeot, Kivalik and Qikiqtani was identified. This need arises from a history of mis-communication regarding **contaminant** issues in Inuit communities. In order to adequately serve the large geographical area, numerous communities and the diverse environment of Nunavut, one full time co-ordinator will be located in Iqaluit and two part-time co-ordinators will be located in Cambridge Bay and Rankin Inlet.

PROJECT SUMMARY:
This project will ensure that RCCs are established in the Inuvialuit, Kitikmeot, Kivalik, North Qikqtani and South Qikiqtani regions. Specific activities of RCCs will include: participating in territorial/regional contaminant committees, acting as a liaison between communities and local/regional boards such as health boards and Band councils, providing updates on contaminant issues at assemblies and meetings and developing resource material for the region through consultation. RCCs will also provide technical support to northern communities by helping to identify research priorities and proposals for the **Northern Contaminants Program (NCP)** and other funding bodies, and by acting as a resource person for regional studies. Finally, RCCs will conduct information workshops in local communities, act as a contact for NCP researchers for consulting the community on project proposals and negotiating research agreements for funded projects, and reporting on project results.



LOCATION(S) OF WORK:
Inuvialuit, Kitikmeot, Kivalik, and Qikiqtani regions

SCHEDULE:
Project activities will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
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TIME FRAME:
April 2000 – March 2001. A number of reports and summaries will be produced throughout the year. A final activity report will be made available shortly after March 2001.

RELATED PROJECTS:
Related projects include "Training and Support for Regional Contaminant Co-ordinators" page 24 in booklet, "Regional Contaminants Co-ordinator: Gwich'in Tribal Council" page 26 in booklet, "Regional Contaminants Co-ordinator: Inuvialuit Regional Corporation" page 28 in booklet, "Regional Contaminants Co-ordinator: Sahtu Contaminants Program" page 30 in booklet, and "Regional Contaminants Co-ordinator: Labrador Inuit Association" page 112 in booklet.

Communication of Dietary Benefit-Risk Information to Five Inuit Regions

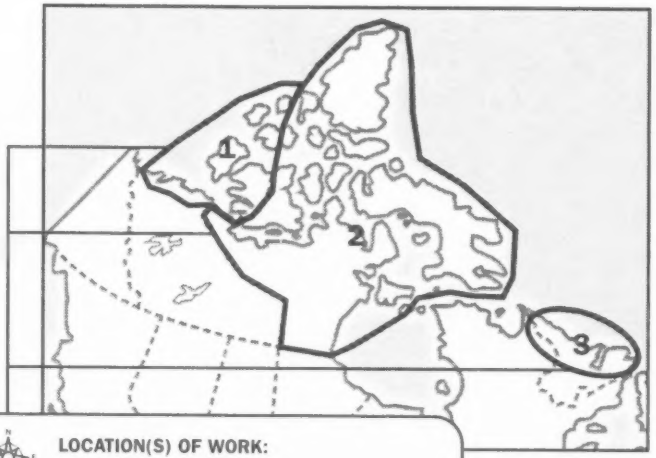
Q How will information on the benefits and risks of consuming traditional/country food be communicated to Inuit communities?

RELEVANCE:

Traditional/country food is very important to the Inuit lifestyle. It defines how Inuit view themselves, contributes to the overall health and well-being of Inuit, and preserves the many benefits of traditional Inuit lifestyles. Therefore, it is important that people become aware of both the benefits and the risks associated with the consumption of traditional/country foods. However, the presence of low levels of **contaminants** in the Arctic traditional/country food has raised concerns about the potential health threat to the **ecosystem** and a risk to Inuit health.

PROJECT SUMMARY:

This project will evaluate and communicate information from the Centre for Indigenous Peoples' Nutrition and Environment (CINE) Dietary Benefit-Risk study through community workshops and discussions to residents of five Inuit regions (Inuvialuit, Kitikmeot, Kivalliq, Qikiqtaaluk, and Labrador) which participated in this study. It will develop advice for communities on contaminant issues by assessing how Inuit diets contribute to their contaminant exposure. This advice will be communicated through a communication/education package that incorporates Inuit knowledge concerning their food. This project will provide Inuit with the appropriate information on the benefits, risks, and importance of traditional lifestyles to assist individuals and communities in making informed decisions about harvesting and consumption of northern foods.



LOCATION(S) OF WORK:
1. Inuvialuit
2. Nunavut (Kitikmeot, Kivalliq, Qikiqtaaluk)
3. Labrador

SCHEDULE:
Visits to the communities will take place from September – December 2000. For more information, please contact project leader directly.

CONTACT INFORMATION:
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TIME FRAME:
April 1997 – March 2001. Communication with residents in the studied regions will be ongoing. Results will be made available to the **Northern Contaminants Program (NCP)**.

Nunavut Environmental Contaminants Committee

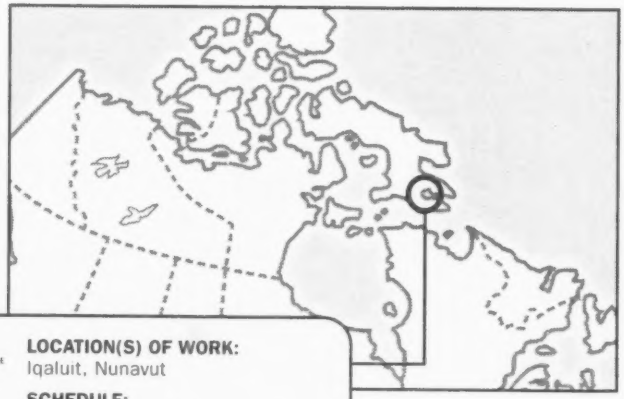
Q How can people in Nunavut find out more about contaminants research and become involved in the Northern Contaminants Program?

RELEVANCE:

Communities in Nunavut, the Northwest Territories and the Yukon are involved with many research and communication efforts under the **Northern Contaminants Program (NCP)**. The Northwest Territories Environmental Contaminants Committee (NWT ECC) and the Yukon Contaminants Committee (YCC) provide Northerners with an avenue for meaningful input into NCP research and communication activities, a means to develop partnerships with researchers, and a forum to express concerns. A separate **contaminants** committee, the Nunavut Environmental Contaminants Committee (NECC), has recently been established to serve the unique interests and concerns of Inuit in Nunavut. Important factors that support a different approach to dealing with contaminant issues in Nunavut include the health risks associated with a marine mammal-based traditional diet and the geographically dispersed and isolated Inuit communities.

PROJECT SUMMARY:

The NECC will help organize scientific research, and communicate information to Nunavut residents about the presence and possible effects of contaminants in the air, land, water, fish, wildlife and humans. The NECC draws its membership from key public agencies responsible for fish and wildlife harvesting, environmental impact and land use, research, and health issues throughout Nunavut. These regionally distributed agencies liaise directly with Nunavut communities, which will allow the NECC to address local concerns, information gaps and research priorities regarding contaminants. The NECC will continue to develop both a communications network, which will make sure that people are informed and involved in contaminants activities, and a resource centre that will act as a store house for environmental contaminants information. This communication network and resource centre will help distribute contaminants information among the residents of Nunavut, researchers, the NCP and other contaminants related programs.



LOCATION(S) OF WORK:
Iqaluit, Nunavut

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Glen Stephens
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E-mail: stephensg@inac.gc.ca

TIME FRAME:
April 2000 – March 2001.

RELATED PROJECTS:
Related projects include "Yukon Contaminants Committee Communications Program" page 10 in booklet, and "Northwest Territories Environmental Contaminants Committee" page 40 in booklet.

Temporal Trends of Persistent Organic Pollutants and Metals in Landlocked Char

Q What are the changes in levels of persistent organic pollutants and heavy metals over time in landlocked char from Char Lake and Resolute Lake?

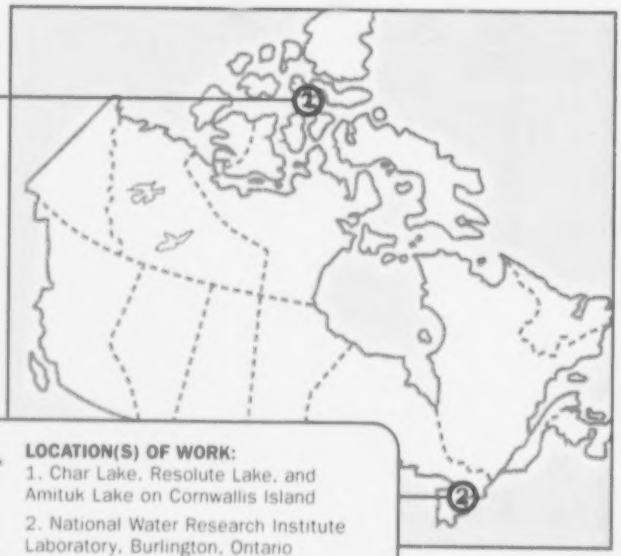
RELEVANCE:

Freshwater fish are directly exposed to **contaminants** deposited from the atmosphere on to snow or directly onto lake surfaces or watersheds. Fish accumulate contaminants and **heavy metals** through their diet and from lake or river water as they pass the water over their gills. Unlike mammals, fish have limited capacity to break down **persistent organic pollutants (POPs)** and thus they eliminate many of these chemicals very slowly. Fish are, therefore, good indicators of freshwater contamination by POPs and heavy metals. However, little information on changes to these contaminants in fish is available.

Atmospheric levels of many POPs are expected to decline due to the signing of recent agreements by many countries to reduce the use of POPs. If contaminant inputs to the lakes decline, contaminant levels in fish are expected to decline as well. The analysis of fish may also indicate if levels of other contaminants, not regulated by the above agreements, are increasing.

PROJECT SUMMARY:

This project will investigate changes in levels of contaminants over time in Arctic char from Char Lake, Resolute Lake and Amituk Lake near Resolute and determine if they are increasing or decreasing. Char Lake and Resolute Lake have been selected because they are well studied lakes with known landlocked char populations, and the major source of contaminants is through the atmosphere from air and snow. The fish will be analysed for POPs, including **PCBs** and heavy metals. Changes over time of levels of contaminants will be determined by analyzing about 10 – 20 fish from each lake every 1 or 2 years for up to 6 years (1997-2003). Fish sampled from Resolute Lake will be **archived** for possible future analysis.



LOCATION(S) OF WORK:
1. Char Lake, Resolute Lake, and Amituk Lake on Cornwallis Island

2. National Water Research Institute Laboratory, Burlington, Ontario

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Derek Muir
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Environment Canada
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L7R 4A6

Phone: (905) 319-6921
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E-mail: derek.muir@cciw.ca

TIME FRAME:
April 1997 – March 2003. Results on contaminant levels in char will be made available to community representatives and the Nunavut Environmental Contaminants Committee on a timely basis. A report will be made available and presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Contaminants in Burbot from Fort Good Hope, Northwest Territories" page 42 in booklet, "Mercury in Fish from Lakes in the Western Northwest Territories" page 44 in booklet, "Mercury in Predatory Fish in the Mackenzie River Basin" page 46 in booklet, and "Contaminants and Heavy Metals in Fish from Great Slave Lake and Slave River" page 48 in booklet.

Effects of Selected Heavy Metals on Arctic Seaducks

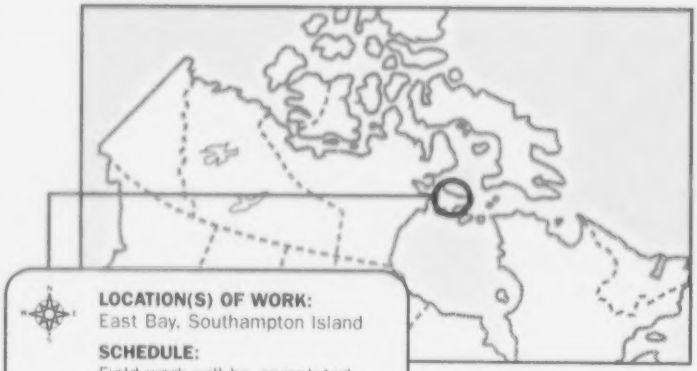
Q What are the effects of heavy metals on Arctic Seaducks?

RELEVANCE:

Contaminants, such as **cadmium**, **mercury**, and **lead**, have been found in Arctic wildlife, including seaducks, which nest in the North. It is not known exactly how these contaminants affect the northern wildlife but it is presumed that these contaminants interact with a species' ability to respond to natural stress in the environment, which may in turn affect the health and fitness of the ducks. The three components of the health and fitness of seaducks that are either directly or indirectly related to contaminants are **disease resistance**, **metabolic** capability, and the ability to respond to stressful situations, such as climate change. It is important to develop tools to observe the physiological responses of seaducks to increased concentrations of metals and their ability to handle stress so that the impacts of increased metal concentration can be properly understood.

PROJECT SUMMARY:

Common eiders will be sampled at the East Bay Migratory Bird Sanctuary on Southampton Island, the site of a long-term study on the population and ecology of common eider ducks in the eastern Canadian Arctic. Researchers will examine the body condition and organ weights of incubating female ducks, and analyze their tissues for **heavy metals**. The relationships among concentrations of **selenium**, a naturally occurring element in the North, lead, mercury, and cadmium in tissues as well as stress response will be observed through the measure of different **immune system** functions.



LOCATION(S) OF WORK:
East Bay, Southampton Island

SCHEDULE:
Field work will be completed during June/July 2000, sample analysis will be completed from August 2000 – March 2001. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Mark Wayland
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Prairie and Northern Wildlife Research Centre
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115 Perimeter Road
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S7N 0X4

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Fax: (306) 975-4089
E-mail: mark.wayland@ec.gc.ca

TIME FRAME:
April 1997 – March 2002. Results of the project will be reviewed and communicated back to northern communities. A report will be made available and presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Persistent Organic Pollutants and Mercury in Arctic Seabird Eggs" page 74 in booklet, and "Role of Heavy Metal Contaminants in Seaduck Population Declines" page 132 in booklet.

Persistent Organic Pollutants and Mercury in Arctic Seabird Eggs

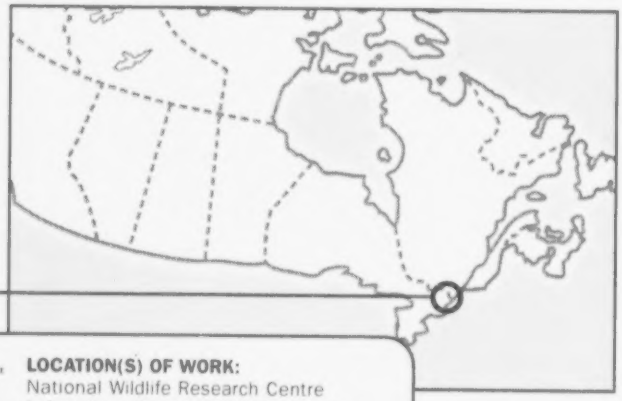
Q Have the levels of persistent organic pollutants in Arctic seabirds increased, decreased or remained the same since the 1970s?

RELEVANCE:

At the present time, the lack of information on changes in the levels of most **contaminants** over time represents a major information gap. A seabird egg monitoring program was established to provide information on the contamination of the marine **ecosystem** and the possible implications for seabird health. Scientists have measured the levels of **persistent organic pollutants (POPs)** in Arctic seabird eggs from Prince Leopold Island since the mid-1970s. Studies have shown that the changes in contaminant levels observed within the seabird eggs have been due to changes in levels of contaminants in the environment rather than changes in the seabird diet.

PROJECT SUMMARY:

Archived Arctic seabird eggs will be re-analyzed for POPs to standardize the results for comparison over time and to confirm whether contaminant levels have been decreasing since the mid-1970s. Eggs and livers of adult birds will be analyzed to identify any "new" POPs that may have entered the Canadian Arctic **food chain**. Mercury measurements on Arctic seabird eggs will be examined to see whether the levels are increasing or decreasing over time. As well, a comparison of the seabird contaminant levels and those levels observed in Canadian Arctic marine mammals will be done to see whether contaminant studies on different animals are providing the same results.



LOCATION(S) OF WORK:
National Wildlife Research Centre
Laboratory, Canadian Wildlife Service,
Hull, Quebec

SCHEDULE:
Laboratory analysis will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Birgit Braune
Canadian Wildlife Service
Environment Canada
100 Gamelin Blvd.
Hull, Quebec
K1A 0H3

Phone: (819) 953-5959
Fax: (819) 953-6612
E-mail: birgit.braune@ec.gc.ca

TIME FRAME:
April 1998 – March 2001. Results of the study will be communicated to northern communities upon completion of the project and presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Effects of Selected Metals on Arctic Seaducks" page 72 in booklet, and "Role of Heavy Metal Contaminants in Seaduck Population Declines" page 132 in booklet.

Persistent Organic Pollutants and Heavy Metals in Canadian Arctic Fox

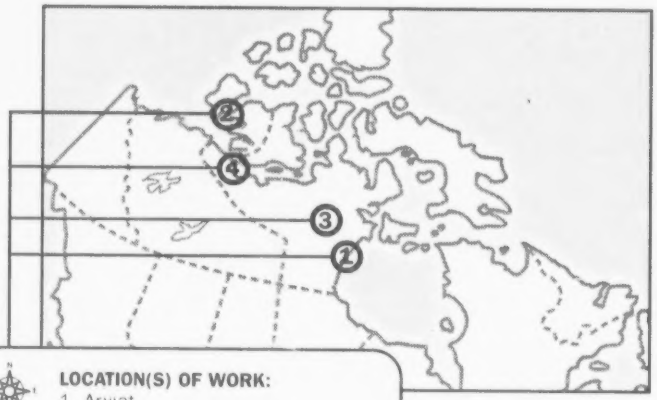
Q What are the levels of persistent organic pollutants and heavy metals in the Arctic fox and do these pose a health risk for the fox?

RELEVANCE:

The Arctic fox is widely distributed across northern Canada and is an economically important species because of its valuable pelt. Large numbers of foxes are harvested in both coastal and inland communities. The diet of the fox differs between inland foxes and coastal/island foxes. On land, Arctic foxes feed mainly on lemmings, birds, and eggs, and scavenge on caribou remains. Coastal foxes eat marine invertebrates and fish in summer and scavenge the remains of seals and newborn seal pups in winter and spring. Recently, **PCB** levels recorded in Arctic fox in the Norwegian Arctic have been high enough to suggest that reproduction problems due to the **toxic** effects of these **contaminants** may be of concern. This is attributed to scavenging on marine mammal carcasses, which have higher levels of **persistent organic pollutants (POPs)** than terrestrial prey. Currently no data for PCB and **heavy metal** levels for Canadian Arctic fox exist.

PROJECT SUMMARY:

This study will determine tissue residue levels of POPs and heavy metals in Arctic fox feeding in or near an Arctic coastal environment, and to assess whether or not these levels pose a potential health risk for the fox. Foxes collected with the help of local hunters and trappers will be analyzed for POPs and heavy metals. The work will take place around the communities of Arviat and Ulukhaqtuuq (along coast) and Qamanittuaq (inland). In addition, POPs and heavy metal levels in wolverines feeding in or near a coastal environment at Qurluqtuuq will be analyzed.



LOCATION(S) OF WORK:

1. Arviat
2. Ulukhaqtuuq (Holman)
3. Qamanittuaq (Baker Lake)
4. Qurluqtuuq (Coppermine) – Kitikmeot Region

SCHEDULE:
For more information, please contact project leaders directly.

CONTACT INFORMATION:

Project Leaders: Birgit Braune
Canadian Wildlife Service
Environment Canada
100 Gamelin Blvd.
Hull, Quebec
K1A 0H3

Phone: (819) 953-5959
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Brett Elkin
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Yellowknife, Northwest Territories
X1A 3S8

Phone: (867) 873-7761
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E-mail: brett_elkin@gov.nt.ca

TIME FRAME:
March 2000 – April 2002. Study results will be presented to each community and at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Effects of Persistent Organic Pollutants on Polar Bears" page 78 in booklet.

Effects of Persistent Organic Pollutants on Polar Bears

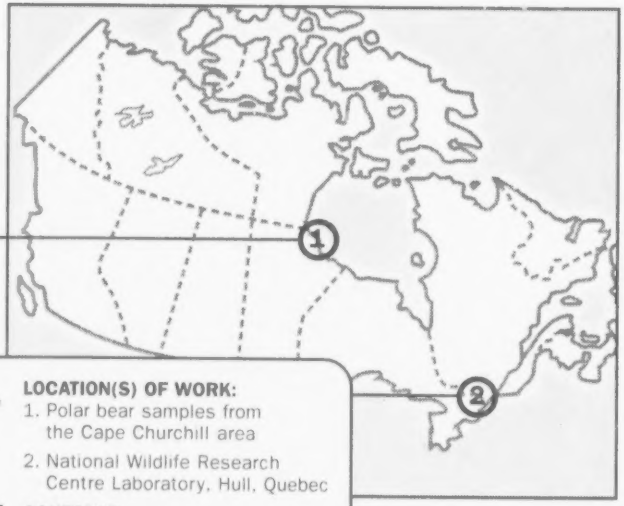
Q How is the immune system of polar bears affected by exposure to persistent organic pollutants?

RELEVANCE:

Polar bears are found at the top of the Arctic **food chain**. Because of this, they tend to have much higher levels of **persistent organic pollutants (POPs)**, such as **PCBs**, in their fat compared to other animals. Studying where the POPs accumulate in the bodies of polar bears and the extent of the accumulation can help in understanding how these pollutants affect the life cycle of bears. The levels of POPs found in polar bears from different regions has been thoroughly studied. It has been found that bears from the European Arctic, east of Greenland, have the highest levels of PCBs, and bears from Alaska have the lowest levels. Concentrations tend to increase from west to east in the Canadian Arctic. PCB exposure can affect the **immune system**, making the bears less able to fight infection.

PROJECT SUMMARY:

The overall objective of this study is to determine the effects, at the individual and population level, of POPs in polar bears, and to determine changes in levels of POPs in the Arctic marine environment using polar bear tissues as a method of **biomonitoring**. This project will study **archived** samples taken from female polar bears from Cape Churchill over 10 years to determine if the levels of POPs in the Arctic marine **ecosystem** are stabilizing. This study will also look at how POPs accumulate in different tissues by examining fat, blood, brain, testis, liver and muscle samples of male polar bears. The rate of **metabolism** of PCBs in polar bears will be studied to understand if this metabolic rate is dependent on the type of PCB.



LOCATION(S) OF WORK:
1. Polar bear samples from the Cape Churchill area
2. National Wildlife Research Centre Laboratory, Hull, Quebec

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Ross Norstrom
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Environment Canada
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Hull, Quebec
K1A 0C7

Phone: (819) 997-1411
Fax: (819) 993-6612
E-mail: ross.norstrom@ec.gc.ca

TIME FRAME:
April 2000 – March 2001. A final report will be prepared for the **Northern Contaminants Program (NCP)** synopsis report and several publications in peer reviewed environmental science journals. Results will be presented at the Annual NCP Results Workshop.

RELATED PROJECTS:
Related projects include "Persistent Organic Pollutants and Heavy Metals in Canadian Arctic Fox" page 76 in booklet.

Temporal Trends of Persistent Organic Pollutants and Metals in Ringed Seals and Walrus from the Canadian Arctic

Q What are the levels of persistent organic pollutants in seals and walrus across the Arctic?

RELEVANCE:

Persistent organic pollutants (POPS) and **heavy metals** have been detected in marine mammals from across the Arctic. However, there are significant geographical gaps in studies that examine **contaminant** trends in marine mammals over time. Previous work on POPs and metals in ringed seals and narwhal from the 1980s and 1990s at locations in the high Arctic and Hudson Bay have not been followed up. By continuing these studies and addressing these information gaps there is an opportunity to determine whether contaminant levels are increasing or decreasing in the animals harvested and to involve the communities in Nunavut and Nunavik in the scientific program.

PROJECT SUMMARY:

This study will determine changes in concentrations of contaminants in ringed seals and walrus from locations studied in the 1980s and 1990s. The information available for most locations is based on samples collected at only two time points. However, with careful selection of locations and the involvement of hunters and trappers committees, it will be possible to generate a third and fourth time point within the next 1 to 4 years at many other communities such as Resolute, Admiralty Inlet (Arctic Bay), Pond Inlet, South Beaufort Sea, Pangnirtung, Arviat and Grise Fiord. This would give an overall time span for contaminant measurements in seals of almost 20 years. For this year, researchers will analyze samples already collected at Grise Fiord, Pangnirtung and Arviat and collect new samples at Resolute, Arctic Bay and Pond Inlet. Next year, samples will be collected at Sach's Harbour and Holman. Funds will be available to pay hunters for all collection and shipping costs. Sampling kits will be provided and a video showing how to do sampling on each animal will be available.

LOCATION(S) OF WORK:

1. Resolute
2. Arctic Bay
3. Pond Inlet
4. National Water Research Institute laboratory, Burlington, Ontario

SCHEDULE:
The project will be taking place throughout the year with sample collection taking place primarily during the spring/summer hunt. To find out exactly when and where the project will be occurring, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Derek Muir
National Water Research Institute,
Environment Canada
867 Lakeshore Rd., P.O. Box 5050
Burlington, Ontario
L7R 4A6

Phone: (905) 319-6921
Fax: (905) 336-6430
E-mail: derek.muir@cciw.ca

TIME FRAME:
April 2000 – March 2004. Information on contaminant levels in the animals collected near each community will be provided to each participating community. Preliminary results will be available at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Contaminants in Canadian Arctic Beluga" page 52 in booklet, and "Temporal Trends of Mercury in Beluga, Narwhal, and Walrus from the Eastern Arctic" page 82 in booklet.

Hg

Temporal Trends of Mercury in Beluga, Narwhal, and Walrus from the Eastern Arctic

Q What are the mercury levels in marine mammals and are these levels changing over time?

RELEVANCE:

Mercury is found in all marine mammal samples from the Canadian Arctic that have been analyzed to date. There is evidence that inputs of mercury to the Arctic through the atmosphere from sources outside the Arctic are increasing as are the levels found in marine mammals and birds. Marine mammals, such as beluga, narwhal, and walrus, make up much of the traditional/country food consumed by Northerners living in the eastern Arctic. Mercury found in these animals can therefore be passed to humans through the **food chain**.

Recent data have shown that whales and seals from the Canadian Arctic live in several non-mixing stocks. Within these stocks the concentration of mercury and other contaminants can vary. This study will acquire additional data on total mercury in tissues of marine mammals from the eastern Arctic over the next several years so that trends can be measured in individual stocks.

PROJECT SUMMARY:

This project will look for changes over time in levels of mercury in tissues of beluga, narwhal, and walrus from the eastern Arctic. This information will also be used to look at levels of mercury on a stock-by-stock basis. **Archived** and newly collected samples of marine mammal tissue (liver, kidney) and teeth will be analyzed. The new samples will be obtained with the help of northern communities using hunter kills. This year, archived and/or new samples will be analyzed from the following communities: Coral Harbour, Arviat, Sanikiluaq and Pangnirtung (beluga), Pond Inlet (narwhal), and Igloolik and Iqaluit (walrus).

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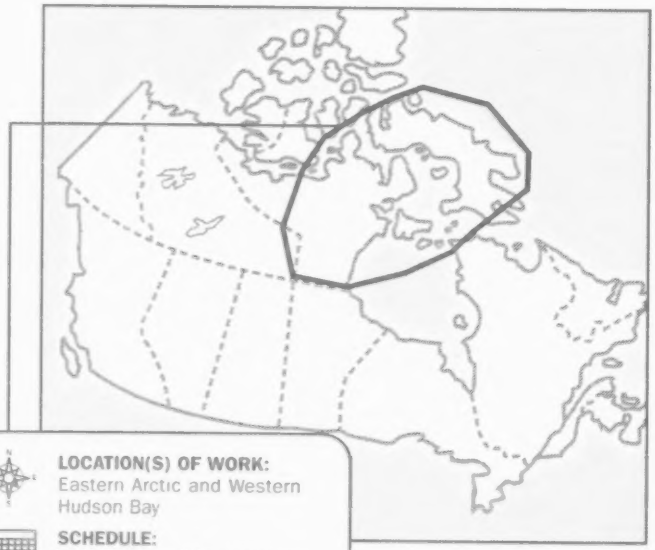

LOCATION(S) OF WORK:
Eastern Arctic and Western Hudson Bay

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leaders directly.

CONTACT INFORMATION:

Project Leaders: Lyle Lockhart
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E-mail: LockhartL@dfo-mpo.gc.ca

Gary Stern
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TIME FRAME:
April 2000 – March 2001. Reports will be made to the Nunavut Wildlife Management Board and local hunter and trapper organizations. Results will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Contaminants in Canadian Arctic Beluga" page 52 in booklet, and "Temporal Trends of Persistent Organic Pollutants and Metals in Ringed Seals and Walrus from the Canadian Arctic" page 80 in booklet.

Wildlife Health Survey – Baffin Region

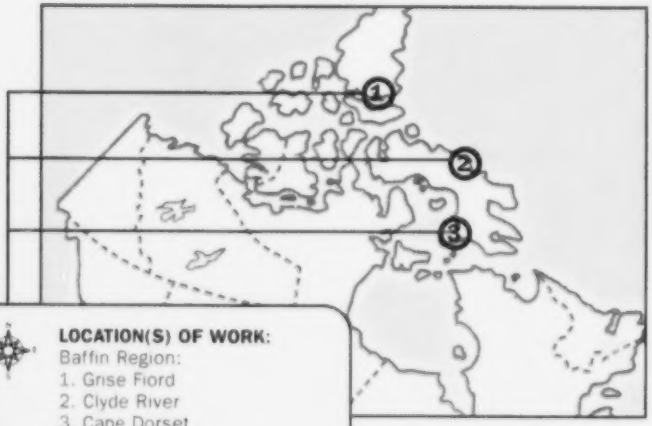
Q How can community members become better involved in monitoring wildlife health?

RELEVANCE:
Arctic communities have important concerns regarding the health of Arctic wildlife, due to reports showing increases in abnormalities and diseases found in the wildlife. Traditional/country foods are rich in protein, mineral, vitamin E, and fatty acids, and are an essential part of the Inuit diet. The following questions on the health of Arctic Wildlife need to be addressed:

"What abnormalities in Arctic wildlife have been observed?"
"Have these abnormalities been seen before, and are they occurring more often?"
"What is causing these abnormalities?"

Community members would also benefit from appropriate training to effectively monitor the health of the wildlife.

PROJECT SUMMARY:
Qikiqtaaluk Wildlife Board (QWB), along with World Wildlife Fund Canada (WWF) are designing a community-based capacity building exercise to monitor wildlife health in the Baffin Region. This program will enable community members to answer questions concerning changes and abnormalities seen in Arctic wildlife and to assess current trends in wildlife health. There are two main components of this project. The first part involves the preparation of an Information Kit, which will contain educational materials to inform communities of common wildlife diseases, with an emphasis on marine mammals, and will be available for the communities' use through the Hunters and Trappers Organizations (HTOs) in the Baffin Region. Training will be provided to resource users to help recognize relevant wildlife abnormalities and disease states. The second part is to conduct a traditional ecological knowledge (TEK) survey on wildlife health, along with the initiation of a community-wide surveillance of wildlife health. In 1999-2000, QWB and WWF completed a survey of TEK in four communities in Baffin Region (Arctic Bay, Hall Beach, Broughton Island, and Kimmirut). Based on its success, the study will be expanded to include Grise Ford, Clyde River, and Cape Dorset.



LOCATION(S) OF WORK:
Baffin Region:
1. Grise Fiord
2. Clyde River
3. Cape Dorset

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Joanasie Akumalik
Qikiqtaaluk Wildlife Board
P.O. Box 478
Iqaluit, Nunavut
X0A 0H0

Phone: (867) 979-1560
Fax: (867) 979-1491
E-mail: qwbrwo@nunanet.com

TIME FRAME:
June 2000 – March 2001. A report will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

Trends in Heavy Metals in Arctic Lake Sediments

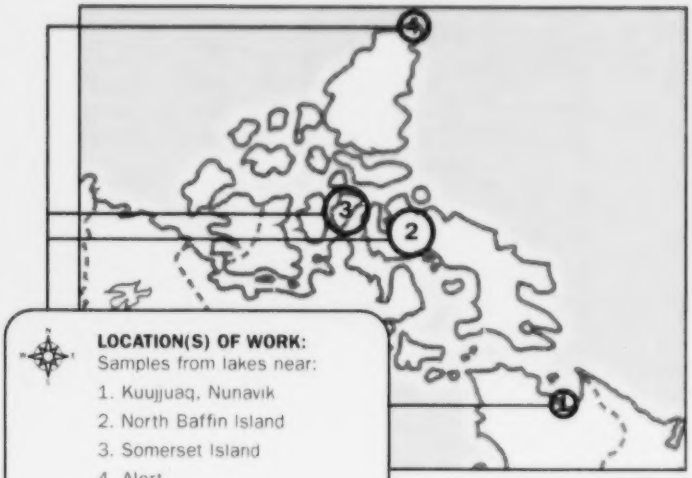
Q What temporal trends in mercury can be seen by examining sediment cores taken in the Arctic?

RELEVANCE:

Heavy metals, particularly **mercury**, have been identified as contaminants of concern in the Arctic. Chemical analysis of sediment cores taken from the bottoms of northern lakes can determine the changes in the levels of heavy metals deposited in the lakes over time. Recent to earlier inputs of heavy metals can be measured from the top to the bottom of the sediment cores. Analyses of mercury and other heavy metals input in northern lakes over time, as recorded in sediment cores, have not been done in many regions. For example, there are gaps in the eastern Arctic (Baffin Island) and in Northern Quebec where no lake sediments have been analyzed for mercury contamination.

PROJECT SUMMARY:

This project will investigate the time records of mercury and **lead** as inferred from dated Arctic sediment cores from lakes in four areas (Kuujjuaq, North Baffin Island, Somerset Island, and Alert). These data will be analyzed to distinguish man made and natural sources for these metals. As well, the concentrations of these metals will be measured and used to determine historical trends. The distribution of these metals across the North may give clues as to the sources of mercury and other metals transported to the Canadian Arctic.



LOCATION(S) OF WORK:
Samples from lakes near:

1. Kuujjuaq, Nunavik
2. North Baffin Island
3. Somerset Island
4. Alert

SCHEDULE:
For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Ven Cheam
National Water Research Institute
Environment Canada
867 Lakeshore Rd., P.O. Box 5050
Burlington, Ontario
L7R 4A6

Phone: (905) 336-4755
Fax: (905) 336-6430
E-mail: ven.cheam@cciw.ca

TIME FRAME:
April 2000 – March 2001. A report will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

Northern Contaminants Air Monitoring: Persistent Organic Pollutant Measurements

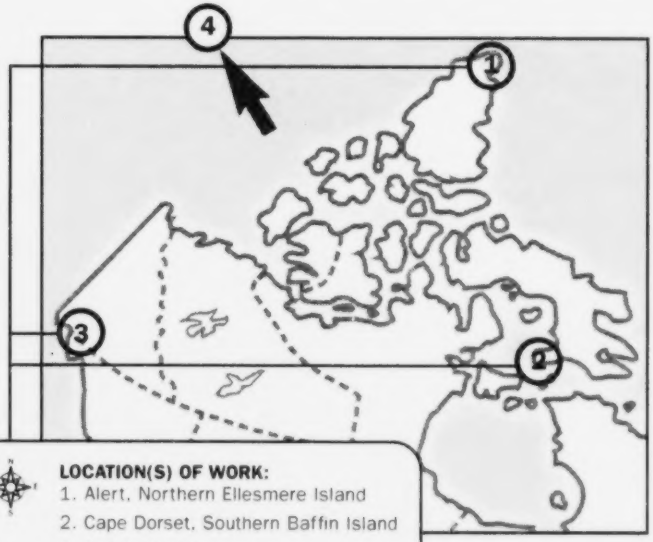
Q What are the levels of persistent organic pollutants entering the Arctic through the air?

RELEVANCE:

Most of the **persistent organic pollutants (POPs)** found in the Arctic are transported in air from sources outside the Arctic. Monitoring the levels of contaminants in air is necessary for assessing any changes in the types and amounts of contaminants transported to the Arctic over time. This study is part of a continuing monitoring program and its results have been and will continue to be used in negotiations for international controls on the use of POPs, and to monitor if those controls are working. Under the **Northern Contaminants Program (NCP)**, levels of contaminants in the Arctic atmosphere have been collected by Canadians over several years from three Canadian air monitoring stations (Alert, Tagish, Cape Dorset) and two stations in Russia (Dunai Island and Amderma). The results from all five air monitoring stations will be used to test atmospheric chemical transport models that explain the transport of contaminants by comparing actual measured levels of contaminants in air with the levels predicted by the models. Some computer models have been developed to explain how contaminants 'hop' from their sources in warm parts of the world to colder regions, such as the Arctic, where they can accumulate.

PROJECT SUMMARY:

In this phase of the project, measurements of POP levels in air will continue to be collected at Alert. The sampling station at Cape Dorset will be re-activated for two years allowing comparison with results collected in 1994-1996. Analysis of data sampled at Alert, Tagish, Cape Dorset and Dunai from 1992 to 1997 will continue. These data will provide baseline data for the levels of POPs in air from Nunavut. Researchers plan to investigate the following issues using these data: the relationship between air concentrations of POPs at Alert and observed changes in POP levels in biota, the relative contribution of new emissions and older residues to levels of **hexachlorocyclohexane (HCH)** in the atmosphere, evidence for **DDT** and **DDE** in the remote Arctic, and the atmospheric cycling of **endosulfan**, a currently used **pesticide**.



LOCATION(S) OF WORK:
1. Alert, Northern Ellesmere Island
2. Cape Dorset, Southern Baffin Island
3. Tagish, Yukon
4. Dunai Island, Russia

SCHEDULE:
The project will be taking place throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Pierrette Blanchard
Meteorological Service of Canada
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4905 Dufferin St.
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Phone: (416) 739-5701
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E-mail: pierrette.blanchard@ec.gc.ca

TIME FRAME:
April 1992 – March 2003.

RELATED PROJECTS:
Related projects include "Assessment of Spatial and Temporal Patterns of HCH Isomers in the Arctic Environment" page 134 in booklet, and "Inventory of Global Lindane and Endosulfan Emissions" page 138 in booklet.

Atmospheric Mercury Measurements at Alert

Q How much mercury is transported to the Arctic through the atmosphere?

RELEVANCE:

Mercury is a **contaminant** of concern in the North because it **bioaccumulates** in Arctic **food chains**. It is naturally present in Arctic rocks, soils and vegetation, but it is also released to the environment through human activities. Mercury can be transported from distant sources to the Arctic in the atmosphere, where it is found as mercury **vapour** or attached to tiny airborne particles. Mercury vapour generally stays airborne for months at a time, but particles can be deposited much more readily onto the land. Most of the particles are deposited with falling snow or rain or directly from the air itself.

PROJECT SUMMARY:

Levels of mercury in the atmosphere have been measured continuously at the air monitoring station near Alert on Ellesmere Island from 1995 to the present. Researchers will continue to measure the levels of mercury in air both as a vapour and on particles, and the levels of mercury in the snow and rain.

Results from monitoring the levels of mercury in the atmosphere and in snow and rainfall will be used to assess whether the levels in the Arctic are changing over time. The results will also be used to describe how much of the mercury that is transported by the atmosphere is actually deposited onto the land in the Arctic. This will help us to understand mercury transformation and deposition processes.

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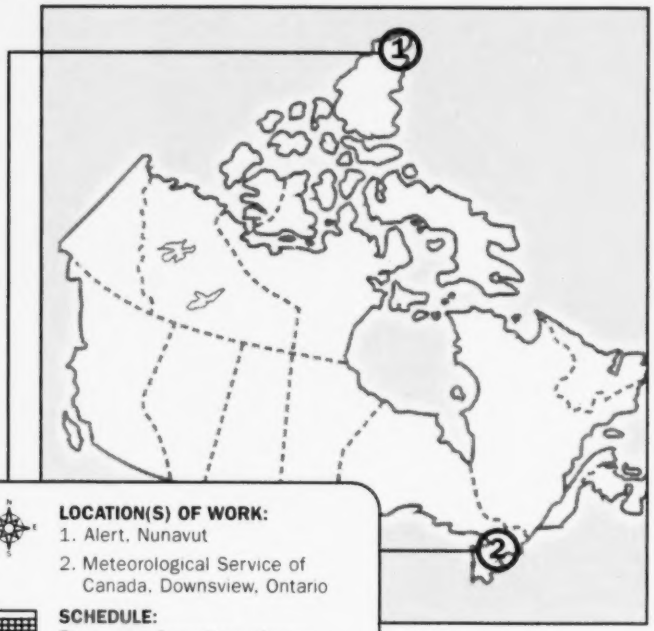


LOCATION(S) OF WORK:
1. Alert, Nunavut
2. Meteorological Service of Canada, Downsview, Ontario

SCHEDULE:
For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Bill Schroeder
Meteorological Service of Canada
Environment Canada
4905 Dufferin St.
Downsview, Ontario
M3H 5T4

Phone: (416) 739-4839
Fax: (416) 739-4318
E-mail: Bill.Schroeder@ec.gc.ca

TIME FRAME:
April 1995 – March 2003. A number of contaminant related reports, publications and models will be made available upon completion of the project. The results will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Atmospheric Mercury Deposition in Nunavik" page 116 in booklet, and "Mercury Measurements at Amderma, Russia" page 136 in booklet.

New Persistent Chemicals in the Arctic Environment

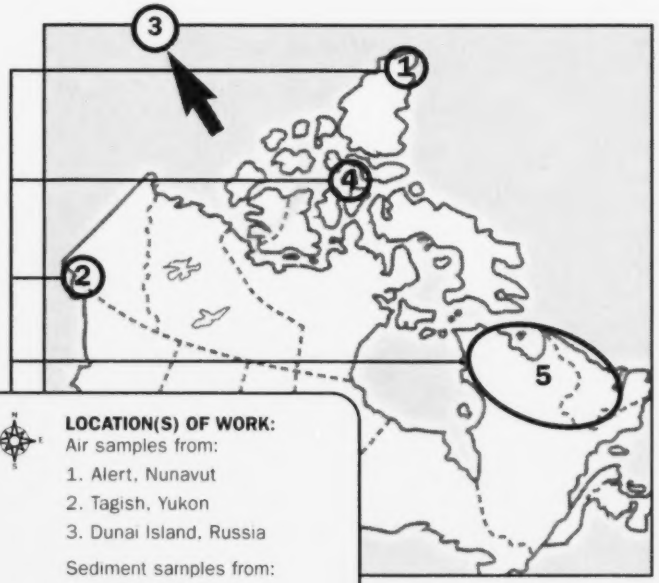
Q Are there any "new" chemicals in the Arctic environment that are not currently being monitored?

RELEVANCE:

The presence of a new chemical in the Arctic is considered as a cautionary sign, signalling the need to evaluate how **persistent** and **toxic** it is under Arctic conditions. A "new" chemical refers to a substance that has not been looked for in the Arctic until now. These new chemicals may have been used and released into the environment further south for many years. They include **pesticides**, industrial chemicals, wood preservatives, and fragrance ingredients for such things as soap. This study will provide an early warning of such chemicals entering the Arctic.

PROJECT SUMMARY:

This project will determine if "new" chemicals are entering the Arctic environment and the **food chain**, and indicate if there is a need to continue monitoring them in the future. Researchers will continue to measure the levels of a number of "new" chemicals in samples of Arctic air, water, sediment, beluga and ringed seal. Levels of these chemicals are expected to be very low as they are not used in the North to any significant extent. To date, the presence of some "new" chemicals have been identified in air and beluga from the initial phase of the study.



LOCATION(S) OF WORK:
Air samples from:

1. Alert, Nunavut
2. Tagish, Yukon
3. Dunai Island, Russia

Sediment samples from:

4. Resolute Area

Seal, walrus samples from:

5. Nunavik and Labrador

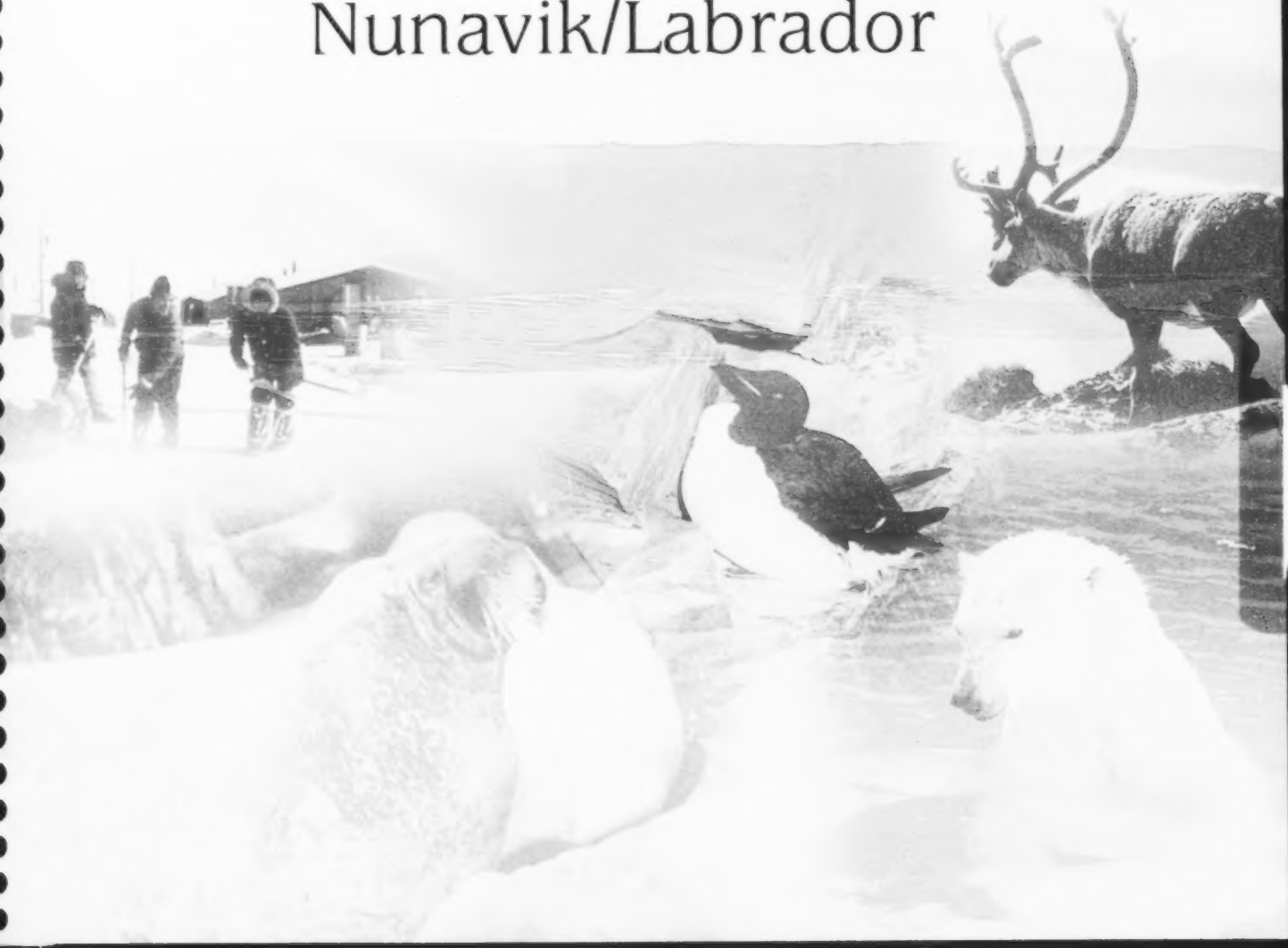
SCHEDULE:
The project will be taking place throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Terry Bidleman
Meteorological Service of Canada,
Environment Canada
4905 Dufferin Street
Downsview, Ontario
M3H 5T4

Phone: (416) 739-5730
Fax: (416) 739-5708
E-mail: terry.bidleman@ec.gc.ca

TIME FRAME:
April 1998 – March 2001. Results will be communicated to northern communities and data will be provided to indigenous people's organizations and to government agencies that are part of the **Northern Contaminants Program (NCP)**.

Nunavik/Labrador



Nunavik/Labrador

The Effects of Prenatal Exposure of Persistent Organic Pollutants and Mercury on the Immune System of Inuit Infants (Year 3)

Q What is the relationship between resistance to infection or disease and early exposure to persistent organic pollutants and mercury?

RELEVANCE:

Environmental **contaminants**, such as **persistent organic pollutants (POPs)** and **mercury**, can accumulate in the bodies of Inuit through consumption of marine mammal fat, particularly from ringed seal and beluga whale. In women, these contaminants can be transferred to the fetus during pregnancy and to the infant during breast feeding. Exposure to these contaminants, both before and after birth, may reduce the ability of infants to resist disease by affecting their **immune system**. It is unknown if the current levels of contaminants in the North are causing such effects in infants.

PROJECT SUMMARY:

This project will examine the effects of prenatal and postnatal (from birth to twelve months of age) exposure to POPs and mercury on the immune system of Inuit infants. Concentrations of POPs and mercury will be obtained from the analysis of umbilical cord blood and breast milk, and from blood samples collected from infants at 6 months of age. About 80 Inuit mothers and their newborns from Nunavik will be involved over the entire study period of 3 years (1998-2001).

LOCATION(S) OF WORK:

1. Puvirnituq (Povungnituq) and Inukjuak, Nunavik
2. Laval University Medical Research Centre, Québec City, Quebec
3. Greenland

SCHEDULE:
The project will be taking place throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Éric Dewailly
Public Health Research Unit
Laval University Medical Research Centre
Centre Hospitalier Universitaire de Québec (CHUQ)
2400 d'Estimauville
Beauport, Quebec
G1E 7G9

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Fax: (418) 666-2776
E-mail: eric.dewailly@crchul.ulaval.ca

TIME FRAME:
April 1998 – March 2001. Up to date reports will be presented to the **Northern Contaminants Program (NCP)** and to Nunavik Nutrition and Health Committee each year. Final results will be made available upon completion of the project in March 2001.

RELATED PROJECTS:
Related projects include "Exposure of Preschool Aged Children to PCBs and Methylmercury" page 100 in booklet, "PCBs and Infant Development" page 102 in booklet, and "Mercury in Salluit: Phase 2 – Effects of Mercury on Oxydative Status and Motor Functions" page 104 in booklet.

Exposure of Preschool Aged Children to PCBs and Methylmercury

Q Are preschool aged children experiencing effects of exposure to PCBs and mercury?

RELEVANCE:

The effects of prenatal exposure to **PCBs** and **methylmercury** through diet have been studied in fish eating populations from various countries and other regions of Canada. Prenatal exposure to PCBs has been linked to deficits in certain aspects of brain and behavioural development. To date, only two studies have provided data for school age children and the effects on other aspects of brain development, which could be related to learning difficulties and disabilities, have yet to be studied. This study will determine if children exposed to **contaminants** (i.e. PCBs and methylmercury) in the womb, or through mother's milk, are showing any effects as they develop to the preschool age (age 5).

PROJECT SUMMARY:

This project will examine the consequences of prenatal exposure to PCBs and methylmercury on brain development in 100 Nunavik Inuit children aged 5-6 years. Prenatal exposure to PCBs and methylmercury has already been documented from umbilical cord blood analysis at birth. Children will take part in an exam in which functions such as co-ordination, eyesight, hearing, and attention will be assessed. This study provides a unique opportunity to obtain more detailed information regarding the long term consequences of PCB and methylmercury exposure.

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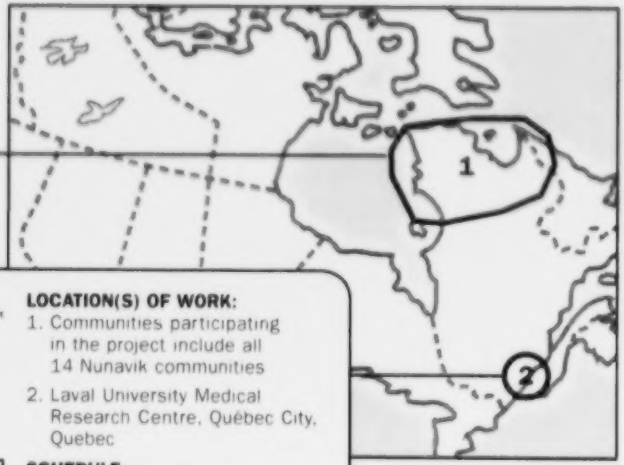


LOCATION(S) OF WORK:

1. Communities participating in the project include all 14 Nunavik communities
2. Laval University Medical Research Centre, Québec City, Quebec

SCHEDULE:
The project will be taking place throughout the year. To find out exactly when and where the project will be occurring, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Gina Muckle
Public Health Research Unit
Laval University Medical Research Centre
Centre Hospitalier Universitaire de Québec (CHUQ)
2400 d'Estimauville
Beauport, Quebec
G1E 7G9

Phone: (418) 666-7000 ext. 360
Fax: (418) 666-2776
E-mail: gmuckle@cspq.qc.ca

TIME FRAME:
November 1995 – March 2002. Initial results of the project will be available in 2002. Updates of the research procedures and progress of the project will be communicated to communities through posters. Up to date reports will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop and to Nunavik Nutrition and Health Committee each year.

RELATED PROJECTS:
Related projects include "The Effects of Prenatal Exposure of Persistent Organic Pollutants and Mercury on the Immune System of Inuit Infants (Year 3)" page 98 in booklet, "PCBs and Infant Development" page 102 in booklet, and "Mercury in Salluit: Phase 2 – Effects of Mercury on Oxydative Status and Motor Functions" page 104 in booklet.

PCBs and Infant Development

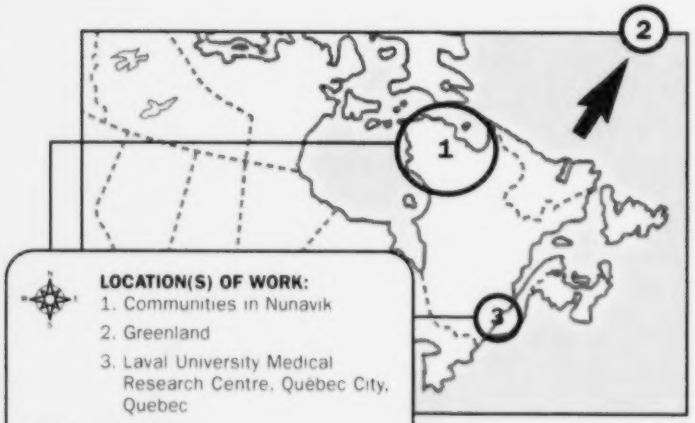
Q Do infants experience any effects of prenatal exposure to PCBs?

RELEVANCE:

PCBs have made their way to the Arctic through the atmosphere and/or the ocean and have **bioaccumulated** in traditional/country foods, such as fish and marine mammals. Inuit are exposed to PCBs by eating these animals. Studies have linked prenatal exposure to delayed gross motor development (e.g. co-ordination) and impaired physical growth and learning development. This study will help to determine if children exposed to PCBs in the womb, or through mother's milk, are experiencing any effects.

PROJECT SUMMARY:

Mothers participating in the study will be asked to allow a scientist or trained health practitioner to assess their baby's overall health, monitor how their baby grows, and measure their baby's development and reactions during the first year of life. Three hundred Inuit infants from Nunavik and Greenland will be assessed at birth and at 6.5 and 11 months of age. With this information, scientists will determine if there is a relationship between a baby's health and development and the levels of PCBs measured in the umbilical cord when the baby is born. Other factors that could contribute to the baby's health and development, such as the mother's diet and lifestyle, will also be considered. This research will provide an opportunity to look at how human exposure to environmental contaminants, such as PCBs, changes over time.



LOCATION(S) OF WORK:
1. Communities in Nunavik
2. Greenland
3. Laval University Medical Research Centre, Québec City, Quebec

SCHEDULE:
The project will be taking place throughout the year. To find out exactly when and where the project will be occurring, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Gina Muckle
Public Health Research Unit
Laval University Medical Research Centre
Centre Hospitalier Universitaire de Québec (CHUQ)
2400 d'Estimauville
Beauport, Quebec
G1E 7G9

Phone: (418) 666-7000 (ext. 360)
Fax: (418) 666-2776
E-mail: gmuckle@cspg.qc.ca

This project is supported by: the Nunavik Nutrition and Health Committee, the mayors, municipal councils, health committees and women's groups of the northern villages of Inukjuak, Puvirnituk (Povungnituq), Salluit, Kuujjuarapik, and Kuujjuaq, the Pauktuutit Inuit Women's Association, Nunalitiqait Ikaluqatigiitut Inuit Association, Ungava Tulattavik Health Centre, Inuulitsivik Health Centre, and the Nunavik Regional Board of Health and Social Services.

TIME FRAME:
November 1995 – March 2002. Updates of the research procedures and progress of the project will be communicated to communities through posters. Up-to-date reports will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop and to the Nunavik Nutrition and Health Committee each year.

RELATED PROJECTS:
Related projects include "The Effects of Prenatal Exposure of Persistent Organic Pollutants and Mercury on the Immune System of Inuit Infants (Year 3)" page 98 in booklet, "Exposure of Preschool Aged Children to PCBs and Methylmercury" page 100 in booklet, and "Mercury in Salluit: Phase 2 – Effects of Mercury on Oxydative Status and Motor Functions" page 104 in booklet.

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Mercury in Salluit: Phase 2 – Effects of Mercury on Oxidative Status and Motor Functions

Q What are the effects of mercury on people from Salluit?

RELEVANCE:

Methylmercury is a major environmental **contaminant** of concern to public health. Currently, it is difficult to determine the threshold of methylmercury concentration at which human motor functions begin to change, although it is well known that continuous methylmercury exposure is very harmful to the central nervous system. Oxidative reactions in the human body appear to be of central importance to mercury toxicity. Studies suggest that methylmercury toxicity can be detected at levels far below the minimal exposure level for methylmercury **toxicity** proposed by the World Health Organization. Therefore, it is important to determine the minimal amount at which oxidative stress and **neurotoxic** effects can be identified.

PROJECT SUMMARY:

This project will evaluate the oxidative status of Sallumiut exposed to mercury and quantify the effects of mercury on motor functions. The researchers propose to test the following hypotheses: oxidative damage and the disruption of involuntary movements are related to the level of mercury exposure; and the consumption of large quantities of **selenium** protects against oxidative damage induced by mercury. This project is a follow-up to "Mercury in People from Salluit: Changes Over Time and Interactions with Selenium" – a study described in the Summary of Northern Contaminants Program – Projects for 1999-2000.

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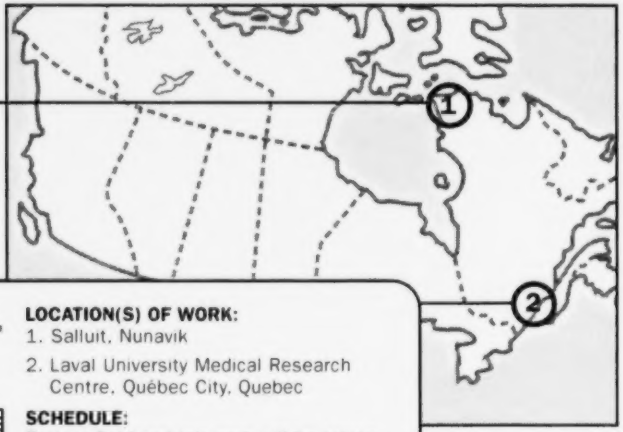


LOCATION(S) OF WORK:
1. Salluit, Nunavik
2. Laval University Medical Research Centre, Québec City, Quebec

SCHEDULE:
Project field and lab work will be taking place throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Éric Dewailly
Public Health Research Unit
Laval University Medical Research Centre
Centre Hospitalier Universitaire de Québec (CHUQ)
2400 d'Estimauville
Beauport, Quebec
G1E 7G9

Phone: (418) 666-7000 (ext. 222)
Fax: (418) 666-2776
E-mail: eric.dewailly@crchul.ulaval.ca

TIME FRAME:
April 2000 – March 2002. The Salluit population, as well as the Nunavik Nutrition and Health Committee members, will be informed of project findings. Up-to-date reports will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop and to the Nunavik Nutrition and Health Committee each year.

RELATED PROJECTS:
Related projects include "Exposure of Preschool Aged Children to PCBs and Methylmercury" page 100 in booklet, and "PCBs and Infant Development" page 102 in booklet.

Contaminant Exposure and Nutritional Status: Cultural and Social Factors

Q What cultural and social factors influence contaminant exposure and the nutritional status of Inuit?

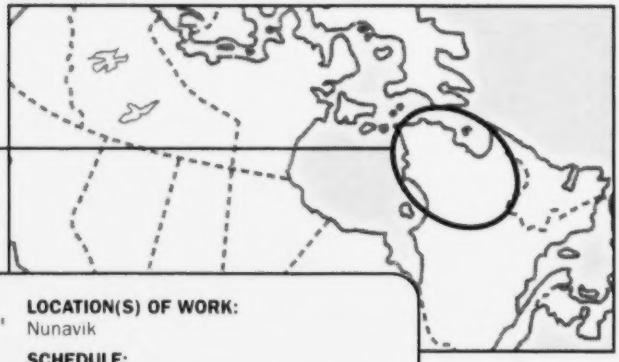
RELEVANCE:

Traditional/country foods are the primary source of exposure to **contaminants** in the environment for the Inuit population. Various studies and programs in Nunavik over the years have assessed which contaminants are potentially harmful to health, what the contaminant exposure levels are in Inuit (breast-fed babies, fetus and adults) and which health effects can be linked to certain exposures.

Dietary studies, conducted to measure daily food and contaminant intakes, have allowed researchers and public health officials to determine which food items are the major sources of exposure and which subgroups of the Inuit population are more exposed or susceptible to contaminants. However, very few dietary studies have investigated the effects of **socio-demographic factors**, such as level of education, household income and occupation of the head of the household, on Inuit food choices. These factors should be analyzed to improve the evaluation of benefits and risks of traditional/country food. The data from the Nutrition Santé Québec Survey are a potential source for this type of analysis and are representative of the entire region of Nunavik.

PROJECT SUMMARY:

This project will provide a detailed analysis of the existing data on food intake among the Inuit of Nunavik collected in 1992 during the Santé Québec Health Survey. Intakes of traditional/country and market foods, nutrients, and contaminants will be calculated and compared according to household structure, education, household income, level of social assistance, and place of residence. Nutrient intakes will be compared with the daily recommended nutrient intakes based on Health Canada's nutritional recommendations. More detailed and reliable information regarding socio-demographic factors affecting food intake, nutritional status and contaminant exposure among Inuit will help public health authorities in promoting health through traditional/country food consumption.



LOCATION(S) OF WORK:
Nunavik

SCHEDULE:
The project will be conducted throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Éric Dewailly
Public Health Research Unit
Laval University Medical Research Centre
Centre Hospitalier Universitaire de Québec (CHUQ)
2400 d'Estimauville
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G1E 7G9

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Fax: (418) 666-2776
E-mail: eric.dewailly@crchul.ulaval.ca

TIME FRAME:
April 2000 – March 2001. The final report will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop and to the Nunavik Nutrition and Health Committee

RELATED PROJECTS:
Related projects include "Food Choice Decisions by Western Arctic Aboriginal Women and Children" page 18 in booklet, "Decision-Making and Inuit Traditional/Country Foods: Balancing the Physical, Economic and Social Components (Year 2)" page 108 in booklet, and "Nutrient Benefits of Traditional/Country Food" page 122 in booklet.

Decision-Making and Inuit Traditional/Country Foods: Balancing the Physical, Economic and Social Components (Year 2)

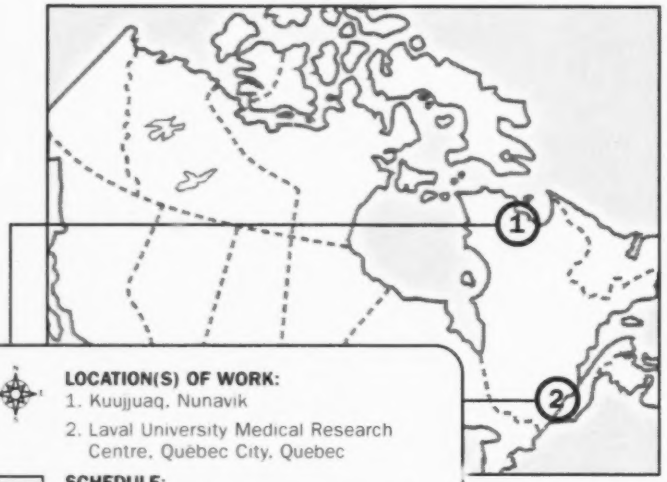
Q What are the benefits and risks associated with eating traditional/country food?

RELEVANCE:

A low incidence of heart disease, diabetes, and some types of **cancer** are among the health benefits of a traditional Inuit diet, which is rich in unsaturated fatty acids and a variety of essential nutrients. As well, traditional knowledge (TK) has long recognized that the gathering and consumption of traditional/country foods contributes to the overall physical, social, and spiritual well-being of Inuit communities. At the same time, the Inuit are increasingly aware of the potential public health risks related to the presence of contamination in northern fish and wildlife. A loss or disruption in the social and cultural benefits of traditional/country food may occur, however, because of confusion and concern over contaminants in food. Therefore, it is important to understand social and cultural factors that influence individual food choices. Information gathered can be used by health professionals and local communities to make informed decisions about food consumption.

PROJECT SUMMARY:

This research project will address the needs of northern health professionals in promoting healthy food choices. It will investigate the benefits of eating traditional/country foods and the factors that influence Northerners' food habits in a balanced and understandable way. This information will help health professionals to understand the dynamics underlying changes in consumption of traditional/country food, and to put in perspective the impacts of communication activities that deal with contaminants research. It will also support the role of Inuit health organizations and advisory groups in providing information to Inuit and Northerners on traditional/country foods, nutrition and health.



LOCATION(S) OF WORK:
1. Kuujjuaq, Nunavik
2. Laval University Medical Research Centre, Québec City, Quebec

SCHEDULE:
The project will be taking place throughout the year. To find out exactly when and where the project will be occurring, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Chris Furgal
Public Health Research Unit
Laval University Medical Research Centre
Centre Hospitalier Universitaire de Québec (CHUQ)
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Beauport, Quebec
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TIME FRAME:
April 1999 – March 2001. Up to date reports will be presented at the Annual **Northern Contaminants Program (NCP)** Result Workshop and to Nunavik Nutrition and Health Committee each year.

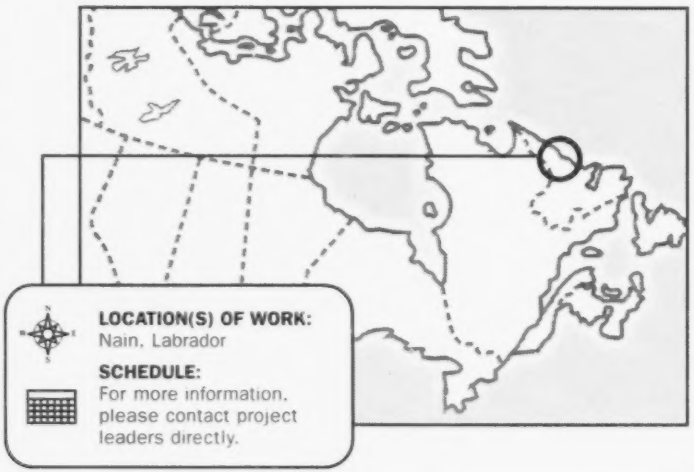
RELATED PROJECTS:
Related projects include "Food Choice Decisions by Western Arctic Aboriginal Women and Children" page 18 in booklet, "Contaminant Exposure and Nutritional Status: Socio-demographic Factors" page 106 in booklet, and "Nutrient Benefits of Traditional/Country Food" page 122 in booklet.

Frontline Training for Community Representatives in Labrador

Q How are key people in communities being trained to deal with information on contaminants?

RELEVANCE:
Representatives and residents of Inuit communities in Labrador have expressed concern over available information on health, the environment and **contaminants**. This information is often not presented in plain language format and communities lack the necessary technology to readily access the information. Community representatives in Labrador have extensive experience in communications, thus making them a valuable part of communications activities. However, community representatives are responsible for dealing with local concerns in an isolated environment with little baseline information. In order to address the concerns of their communities, these representatives would benefit from focussed training on health, environmental and contaminants information related to the **Northern Contaminants Program (NCP)**. This training would assist the community representatives in becoming more knowledgeable about recent contaminants information and the types of research being conducted in the region, and enable them to deliver messages that are relevant to their communities.

PROJECT SUMMARY:
The Labrador Inuit Association (LIA) Research Office will hold a three day workshop in Nain, Newfoundland for the staff of LIA and colleagues who are responsible for communicating information on health, environment and contaminant issues, and related research projects in the region. Participants will be given basic information on contaminants, research methodology, and community rights relating to conduct of research done by outside researchers. Tools to access information, resources, and contacts, and to identify potential opportunities for community involvement with outside researchers will be provided for the representatives. The workshop will raise awareness and understanding to empower community representatives in their role and involvement in health and environment research in their community and region. This will support and enhance their ability to access and deliver information and to address community questions and concerns on contaminant issues.



LOCATION(S) OF WORK:
Nain, Labrador

SCHEDULE:
For more information, please contact project leaders directly.

CONTACT INFORMATION:
Project Leaders: Joanna Lampe and Frances Murphy
Research Department
Labrador Inuit Association
P.O. Box 280
Nain, Newfoundland
A0P 1L0

Phone: (709) 922-2864/2847
Fax: (709) 922-1040
E-mail: natsiq@cancom.net

TIME FRAME:
April 2000 – March 2001.

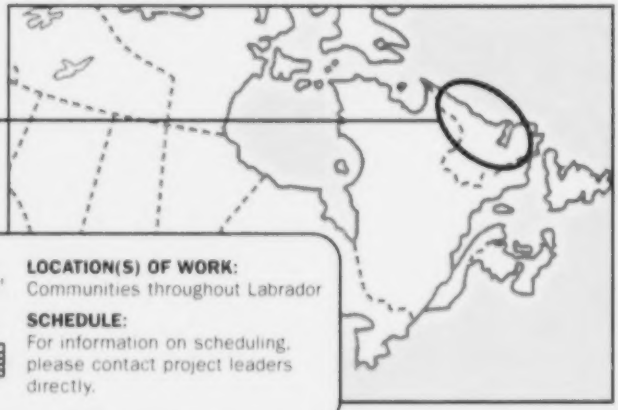
RELATED PROJECTS:
Related projects include "Frontline Training for Community Professionals" page 4 in booklet, "Frontline Training Course for Community Professionals: Métis Nation-NWT and Dene Nation" page 22 in booklet, and "Training and Support for Regional Contaminant Co-ordinators" page 24 in booklet.

Regional Contaminants Co-ordinator: Labrador Inuit Association

Q How can we better communicate information on contaminants research to Labrador communities?

RELEVANCE:
Labrador Inuit depend on fish and wildlife for food and are aware of the presence of **contaminants** in the environment affecting these food sources. In order for Labrador Inuit to make informed decisions about the food they eat, information on contaminants and their effects on the environment and human health must be translated and communicated in plain language. The relationship between Labrador Inuit and outside researchers, in the past, has lacked understanding of the Inuit culture and proper communications procedures. Improvements have been made, however the need still exists for a Regional Contaminants Co-ordinator (RCC) to aid in establishing a mutually beneficial relationship among individuals, communities and outside researchers.

PROJECT SUMMARY:
The RCC will provide information from research on contaminants and their effects on the environment and human health so that Labrador Inuit can make informed decisions on they food they eat. The RCC will take into account the different languages and needs of individuals and communities of Labrador. In consultation with community representatives responsible for communication of health and environment-related issues, the RCC will determine the best method of communicating with communities. The RCC will assist communities to identify and prioritize contaminants issues and assist in communicating community concerns and priorities to appropriate authorities. Community resource materials will be developed in Inuktitut and English in consultation with the communities. The RCC will also be responsible for assisting outside researchers with community consultations including negotiating research agreements and reporting project results to communities.



LOCATION(S) OF WORK:
Communities throughout Labrador

SCHEDULE:
For information on scheduling, please contact project leaders directly.

CONTACT INFORMATION:
Project Leaders: Joanna Lampe and Frances Murphy
Research Department
Labrador Inuit Association
P.O. Box 280
Nain, Newfoundland
A0P 1L0

Phone: (709) 922-2864/2847
Fax: (709) 922-1040
E-mail: natsiq@cancom.net

TIME FRAME:
April 2000 – March 2001.

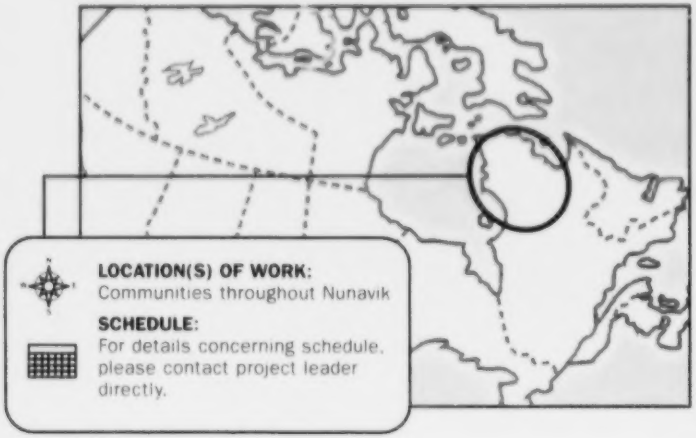
RELATED PROJECTS:
Related projects include "Training and Support for Regional Contaminant Co-ordinators" page 24 in booklet, "Regional Contaminants Co-ordinator: Gwich'in Tribal Council" page 26 in booklet, "Regional Contaminants Co-ordinator: Inuvialuit Regional Corporation" page 28 in booklet, "Regional Contaminants Co-ordinator: Sahtu Contaminants Program" page 30 in booklet.

Public Management of Environmental Health Information

Q How should information on nutrition, contaminants and health issues be communicated to the public?

RELEVANCE:
In Nunavik, the amount of information on nutrition, **contaminants**, and health issues has increased significantly in recent years. However, much of this information is not fully accessible to the communities. Access to information can be improved through sharing knowledge concerning environmental health and deriving a common communication approach among the health professionals who deal with the concerns and priorities of the public. Thus research can be dealt with in a thorough and consistent manner.

PROJECT SUMMARY:
The Nunavik Nutrition and Health Committee will make information produced by environmental, health and contaminants studies available and understandable to the public, local health workers and professionals. It will also help researchers to put their research results into an understandable format for the public. Communication of this information will be done through the preparation of documents written for public use, the development of a contaminants curriculum for Nunavik schools, and other means of communication, such as pamphlets, phone-in shows, public service announcements and local meetings.



LOCATION(S) OF WORK:
Communities throughout Nunavik

SCHEDULE:
For details concerning schedule, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Minnie Grey
Nunavik Nutrition and Health Committee
P.O. Box 149
Kuujjuaq, Quebec
J0M 1C0

Phone: (819) 964-2905
Fax: (819) 964-6353
E-mail: mgrey@ssss.gouv.qc.ca

TIME FRAME:
April 2000 – March 2001.

RELATED PROJECTS:
Related projects include "Yukon Contaminants Committee Communications Program" page 10 in booklet, "Northwest Territories Environmental Contaminants Committee" page 40 in booklet, and "Nunavut Environmental Contaminants Committee" page 68 in booklet.

Hg

Atmospheric Mercury Deposition in Nunavik

Q How is mercury transferred from the air to the Northern environment?

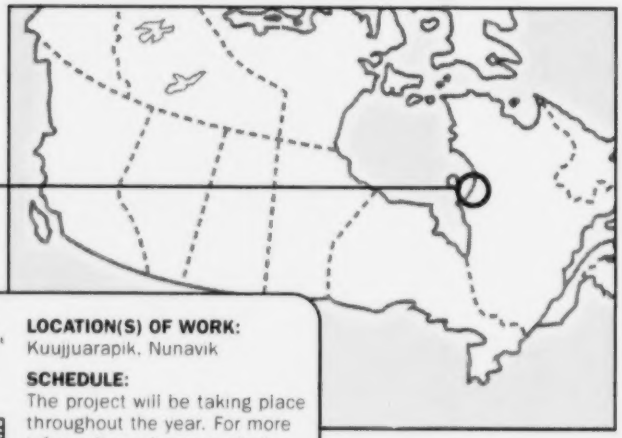
RELEVANCE:

Mercury is one of the most toxic **contaminants** in the environment. The **long-range transport** of mercury through the atmosphere from places outside the North may be an important potential source of mercury contamination in Nunavik. However, the extent of atmospheric transport and deposition of mercury has never been assessed and measured. Therefore, it is important to identify how mercury is transferred from the air to the Northern environment, where it is deposited, and in what amounts. This information will assist in the development of international controls and regulations for mercury, and allow for a better understanding of mercury contributions in Nunavik from different sources.

PROJECT SUMMARY:

This project will study the long-range transport of mercury and its deposition in the Arctic environment. Specifically, it will investigate natural Arctic conditions that favour the release of some chemical compounds (such as bromine and **chlorine**) from seawater that may react with atmospheric mercury and increase its deposition. The amount and distribution of mercury throughout the study region will be compared with other reference sites in the North. The project will also study the connection between atmospheric mercury deposition and mercury in the **food chain**.

Hg



LOCATION(S) OF WORK:
Kuujjuarapik, Nunavik

SCHEDULE:
The project will be taking place throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Laurier Poissant
Meteorological Service of Canada
Environment Canada
105 McGill St, 7th Floor
Montréal, Quebec
H2Y 2E7

Phone: (514) 283-1140
Fax: (514) 283-8869
E-mail: laurier.poissant@ec.gc.ca

TIME FRAME:
April 1999 – March 2001. The results of the study will be communicated to Nunavik communities and presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Atmospheric Mercury Measurements at Alert" page 90 in booklet, and "Mercury Measurements at Amderma, Russia" page 136 in booklet.

Other Locations

Other Locations

Nutrient Benefits of Traditional/Country Food

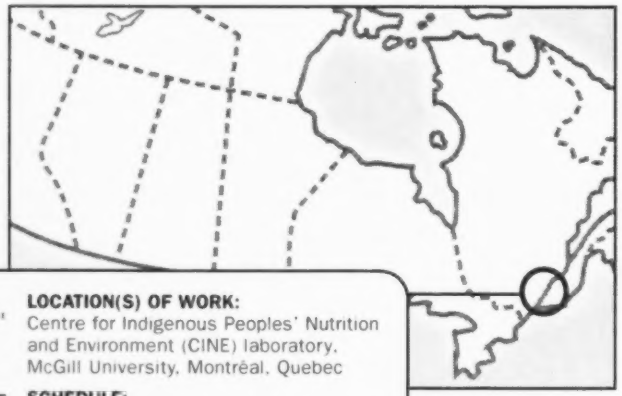
Q What are the nutritional benefits of traditional/country foods?

RELEVANCE:

Benefit and risk assessments of traditional/country food should include nutrient information on food items that are commonly consumed by Northerners. While most market foods have nutrient information available, the same can not be said for traditional/country foods. This is particularly true for nutrients, such as vitamins and fatty acids, that are not stable under normal storage conditions. Analysis of dietary data from Dene/Métis, Yukon and Inuit communities have consistently shown that traditional/country food provides rich sources for many nutrients, and that this source of food has greater nutrient value than the market food regularly available and generally selected in communities. Dietary evaluations conducted by the Centre for Indigenous Peoples' Nutrition and Environment (CINE) have identified the traditional/country foods most frequently consumed. Analyses of some food samples to date have indicated sources of nutrients to a limited extent. However, there are several traditional/country food items frequently consumed for which inadequate nutrient composition exists.

PROJECT SUMMARY:

This project will address the gaps in nutrient information for some traditional/country foods. Approximately 50 different samples from foods frequently consumed will each be analyzed for 30 nutrients. A call for samples of food ready for consumption will be made to different communities across the North with instructions for sample preparation, packaging and labeling. Frozen samples will be sent to CINE during April and October of this year. It is not anticipated that any community will provide more than one or two samples.



LOCATION(S) OF WORK:
Centre for Indigenous Peoples' Nutrition and Environment (CINE) laboratory, McGill University, Montréal, Quebec

SCHEDULE:
Samples will be collected from April to October. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: H.V. Kuhnlein.
Centre for Indigenous Peoples' Nutrition and Environment (CINE)
McGill University
21,111 Lakeshore Road
Ste. Anne de Bellevue, Quebec
H9X 3V9

Phone: (514) 398-7671
Fax: (514) 398-1020
E-mail: kuhnlein@macdonald.mcgill.ca

TIME FRAME:
April 2000 – March 2001. Preliminary results will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Food Choice Decisions by Western Arctic Aboriginal Women and Children" page 18 in booklet, "Contaminant Exposure and Nutritional Status: Socio-demographic Factors" page 106 in booklet, and "Decision-Making and Inuit Traditional/Country Foods: Balancing the Physical, Economic and Social Components (Year 2)" page 108 in booklet.

Dietary Effects on Methylmercury Toxicity in Rats (Year 2)

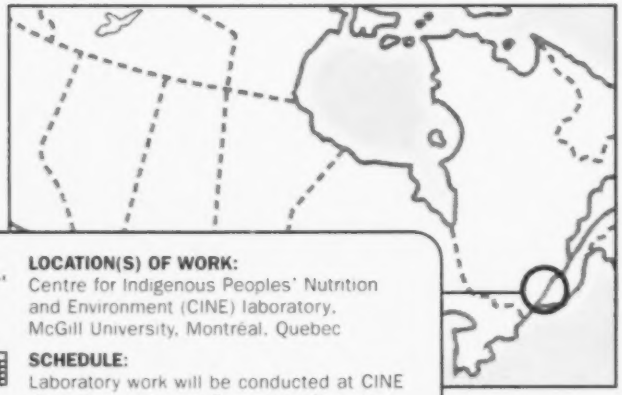
Q What are the effects of dietary factors on the toxicity of methylmercury?

RELEVANCE:

Elevated levels of **mercury** and **methylmercury** have been reported in the terrestrial, freshwater and marine **biota** in the Canadian North. Ringed seal, the most abundant marine mammal species in the Canadian Arctic, is a major component of the Inuit traditional diet and is rich in beneficial nutrients, protein, oil, vitamins and minerals. Elevated levels of mercury are commonly found in ringed seal meat and Inuit people may, therefore, be exposed to mercury through the traditional diet. Recently, there has been evidence that shows that some nutrients in traditional/country foods may protect against methylmercury toxicity. Because of this, it is important to identify the dietary factors which could influence methylmercury **toxicity** and to understand possible interactions between nutrients and **contaminants** in the diet.

PROJECT SUMMARY:

This project will study the effects of nutrients on mercury toxicity. A series of feeding experiments will be conducted where rats will be fed diets containing different nutrient compositions. The rats will be injected with methylmercury and the degree to which each nutrient protects against methylmercury toxicity will be measured. Results will be used to characterize the health risk of mercury in the Inuit diet.



LOCATION(S) OF WORK:
Centre for Indigenous Peoples' Nutrition and Environment (CINE) laboratory, McGill University, Montréal, Quebec

SCHEDULE:
Laboratory work will be conducted at CINE throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Laurie H.M. Chan
Centre for Indigenous Peoples' Nutrition and Environment (CINE)
McGill University
21, 111 Lakeshore
Ste. Anne de Bellevue, Quebec
H9X 3V9

Phone: (514) 398-7765
Fax: (514) 398-1020
E-mail: chan@macdonald.mcgill.ca

TIME FRAME:
April 2000 – March 2001. Information will be made available to answer concerns on the safety of food upon completion of the project. Results will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

Changes in Chlordane Residues in Rat Tissues Over Time

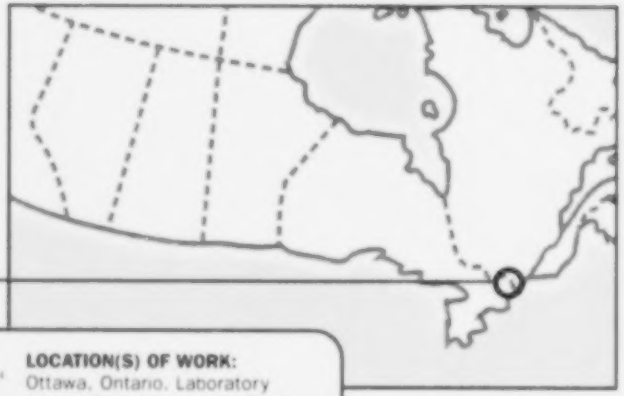
Q What happens to chlordane when it enters the human body through the consumption of contaminated food?

RELEVANCE:

Chlordane is a mixture of structurally similar chemicals which were used as **pesticides** until the late 1980s. *Trans*-nonachlor is a component of chlordane, and oxychlordane is both a component and the primary **metabolite** of many other components in this mixture. Both *trans*-nonachlor and oxychlordane are stable and can be found in the fat and flesh of animals used as food by people living in the Canadian Arctic. **Toxicology** studies have been done using rats to identify the target organs and **toxic** effects caused by ingesting *trans*-nonachlor or oxychlordane. Data from the toxicology studies will be used to calculate the level of exposure to these **contaminants** that is safe for humans.

PROJECT SUMMARY:

This study will look at what happens to *trans*-nonachlor and oxychlordane stored in body fat, including whether some *trans*-nonachlor changes to oxychlordane over time, and the extent to which oxychlordane levels stored in the body change over time after exposure. Since toxicology studies showed differences in the amounts of chemicals stored in the body fat of male versus female rats, this research will also examine whether *trans*-nonachlor or oxychlordane is stored for longer periods of time in males or in females. All of this information will contribute to our understanding of what happens to *trans*-nonachlor and oxychlordane when it enters the body through the consumption of contaminated food, and will help in making informed decisions about the risks of human exposure to these contaminants.



LOCATION(S) OF WORK:
Ottawa, Ontario. Laboratory work will be done at the Food Directorate, Health Canada and the Canadian Wildlife Service, Environment Canada

SCHEDULE:
For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Genevieve Bondy
Toxicology Research Division
Food Directorate
Health Protection Branch
Health Canada
2E Banting Building
Ottawa, Ontario
K1A 0L2

Phone: (613) 957-2051
Fax: (613) 941-6959
E-mail: Genevieve_Bondy@hc-sc.gc.ca

TIME FRAME:
April 2000 – March 2002. Preliminary results will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop. Completed studies will be published in peer-reviewed journals.

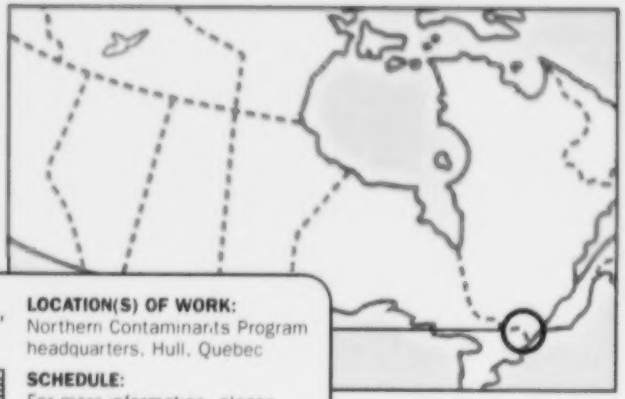
RELATED PROJECTS:
Related projects include "Dietary Effects of on Methylmercury Toxicity in Rats (Year 2)" page 124 in booklet.

Co-ordination and Administration of the Northern Contaminants Program

Q How is the Northern Contaminants Program administered?

RELEVANCE:
Since 1991/1992, the Department of Indian and Northern Affairs (DIAND) headquarters has maintained the **Northern Contaminants Program (NCP)** secretariat function of co-ordinating the resources and activities of the program among four federal departments, territorial government departments, five Aboriginal organizations, and many universities and research institutes according to a co-management framework. DIAND has provided the NCP with financial administration and management services to support over 200 projects. DIAND also maintains the chairs for the NCP Management Committee and some of the proposal Review Teams. These review teams facilitate the review of proposals under each of the program's components: human health, ecosystem monitoring, communications and education, and international policy. This management structure will ensure that the program remains scientifically defensible, while at the same time, achieves real progress in terms of its broad policy objectives.

PROJECT SUMMARY:
DIAND headquarters will continue to provide the administrative, financial and logistical support required to manage the NCP by organizing various program activities, such as meetings and workshops. DIAND will also co-ordinate and implement various communications activities in cooperation with Aboriginal organizations and territorial environmental contaminants committees. A website for the NCP has been developed (http://www.inac.gc.ca/ncp) and the annual reporting of project activities through the Results Workshop, the Synopsis of Research Report and the NCP Summary "Booklet" will continue. In addition, a comprehensive database of current and past NCP projects will be developed and the co-ordination of the Canadian Arctic Contaminants Assessment Report – Phase II will begin.



LOCATION(S) OF WORK:
Northern Contaminants Program headquarters, Hull, Quebec

SCHEDULE:
For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: David Stone
Director
Northern Science and Contaminants Research
Department of Indian Affairs and Northern Development (DIAND)
10 Wellington Street
Hull, Quebec
K1A 0H4

Phone: (819) 997-0045
Fax: (819) 953-9066
E-mail: stoned@inac.gc.ca

TIME FRAME:
April 1999 – March 2003.

RELATED PROJECTS:
Related projects include "Yukon Contaminants Committee Communications Program" page 10 in booklet, "Northwest Territories Environmental Contaminants Committee" page 40 in booklet, and "Nunavut Environmental Contaminants Committee" page 68 in booklet.

QA/QC

Northern Contaminants Interlaboratory Quality Assurance Program

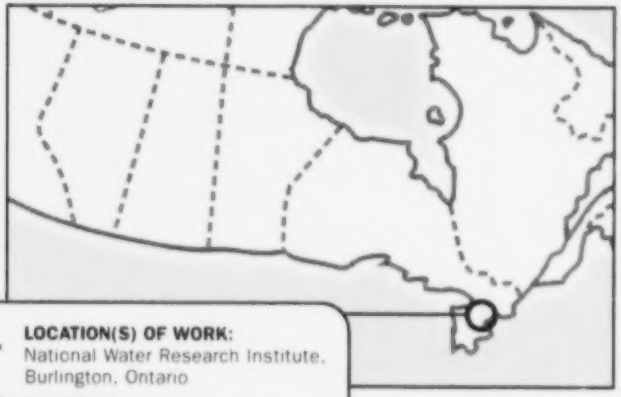
Q How can we make sure that all Northern Contaminants Program laboratory data are accurate, reliable and comparable?

RELEVANCE:

Quality Assurance/Quality Control (QA/QC) are essential elements of all research and monitoring programs. Laboratory comparison studies provide assurance on the quality and reliability of data being generated and on the comparability of measurement results between laboratories. Without this assurance of data quality and comparability, the value of measurement information upon which decisions are made will be lost. It is important that **Northern Contaminants Program (NCP)** managers and Northerners have a scientifically sound base upon which to base their decisions regarding the sources of **contaminants** and their effects on the Arctic environment and on human health. In addition, this information will ensure that the NCP's contribution to international agreements and controls to protect the health of the Arctic ecosystem and Northerners is based on scientifically sound data.

PROJECT SUMMARY:

This project will ensure that contaminants data produced in laboratories are determined with acceptable levels of precision and accuracy, and that there will be comparability of data among the different laboratories and between research projects. This year's work will include interlaboratory comparisons of **heavy metal** and **toxaphene** analyses of samples taken from northern animals.



LOCATION(S) OF WORK:
National Water Research Institute,
Burlington, Ontario

SCHEDULE:
The project will be occurring throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
Project Leader: Yvonne Stokker
National Water Research Institute
Environment Canada
867 Lakeshore Rd., P.O. Box 5050
Burlington, Ontario
L7R 4A6

Phone: (905) 336-4869
Fax: (905) 336-8914
E-mail: yvonne.stokker@cciw.ca

TIME FRAME:
April 2000 – March 2001.

Role of Heavy Metal Contaminants in Seaduck Population Declines

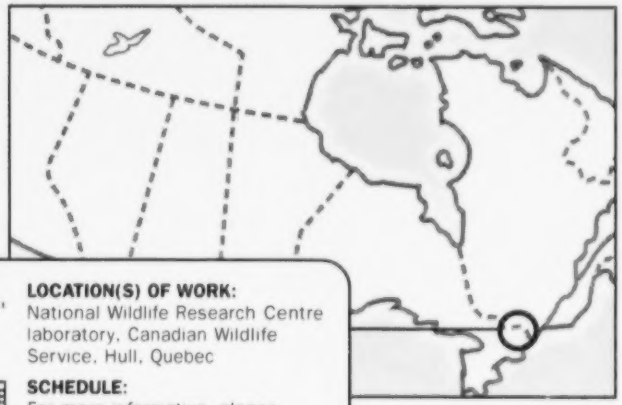
Q Is heavy metal contamination in Oldsquaw ducks leading to population declines?

RELEVANCE:

Populations of Oldsquaw are declining in western North America. This species breeds exclusively in the Arctic and nests there in greater numbers than any other duck. Oldsquaw are harvested by Aboriginal people and sports hunters, however the numbers harvested by these two groups are not likely to be the cause of this decline. **Heavy metal** contamination may be an important threat to Oldsquaw. Between 1988 and 1997, Oldsquaw were collected from across the Canadian Arctic and tissues from these birds were **archived**. Analyses of heavy metal levels in the birds will help determine if they are more exposed to heavy metal contamination in the Arctic breeding grounds or in their overwintering grounds.

PROJECT SUMMARY:

In order to determine the role of **contaminants** in declining populations of Oldsquaw, archived tissue samples from adult Oldsquaw, collected from their Canadian Arctic breeding grounds, were analyzed for **mercury**, **selenium** and copper (in liver), **cadmium** (in kidney) and **lead** (in bone). Some samples of liver were also analyzed for a wider range of metals. This year, samples of bone from birds analyzed previously will be re-analyzed to determine whether birds from certain geographical areas of the Arctic are overwintering in freshwater (i.e. the Great Lakes) or marine environments. Such information could be used to determine if birds overwintering on the Great Lakes risk greater exposure to contaminants than those overwintering in marine environments.



LOCATION(S) OF WORK:
National Wildlife Research Centre laboratory, Canadian Wildlife Service, Hull, Quebec

SCHEDULE:
For more information, please contact project leader directly.

CONTACT INFORMATION:
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TIME FRAME:
April 1999 – March 2002. Results will be reviewed and communicated back to northern communities upon completion of the project and presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Effects of Selected Metals on Arctic Seaducks" page 72 in booklet, and "Persistent Organic Pollutants and Mercury in Arctic Seabird Eggs" page 74 in booklet.

Assessment of Spatial and Temporal Patterns of HCH Isomers in the Arctic Environment

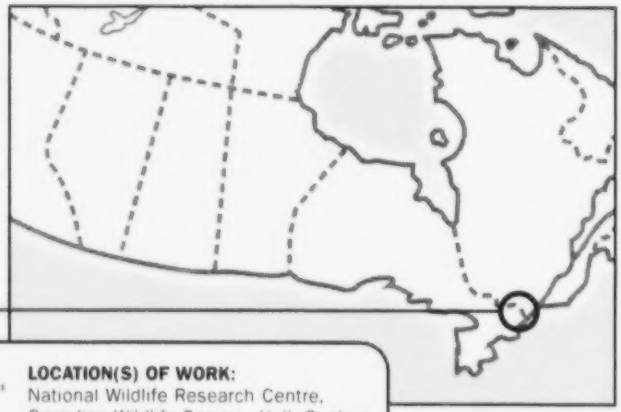
Q What are the spatial and temporal patterns of HCH in the Arctic biotic and abiotic environments?

RELEVANCE:

Hexachlorocyclohexanes (HCHs) are the most abundant **persistent organic pollutant (POP)** in the Arctic Ocean. They evaporate quickly from temperate and tropical regions, are carried through the atmosphere and deposited to the ground and water surfaces through air-water gas exchange and precipitation. HCHs are present at low levels in Arctic air and sea water and are found in increasing concentration at higher **trophic levels**. Preliminary analyses of data for ringed seals, polar bears and Arctic seabirds indicate that one **isomer** of HCH (ß-HCH) increased during the 1980s and may now be decreasing as predicted. However, the concentration of ß-HCH has not been found to increase smoothly with trophic levels. For example, a large amount of ß-HCH has been detected in polar bear fat with considerably smaller levels found in the prey species of polar bears.

PROJECT SUMMARY:

This project will assess how HCH isomers in the Arctic **abiotic** and **biotic** environments are distributed geographically and over time. It will include a review and synthesis of existing data for HCH isomers and their ratios in air, water and **biota** from the Canadian Arctic, and incorporate new air and water samples taken last year. Specifically, the project will try to confirm that HCH concentrations in Arctic marine biota are following similar trends found in surface seawater, that is, decreasing from west to east, and that HCH levels in top Arctic predators are declining.



LOCATION(S) OF WORK:
National Wildlife Research Centre,
Canadian Wildlife Service, Hull, Quebec

SCHEDULE:
For more information, please contact project leader directly.

CONTACT INFORMATION:
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TIME FRAME:
April 2000 – March 2001. Final results will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

Hg

Mercury Measurements at Amderma, Russia

Q How much mercury is being transported and deposited in the Arctic, as measured at Amderma, Russia?

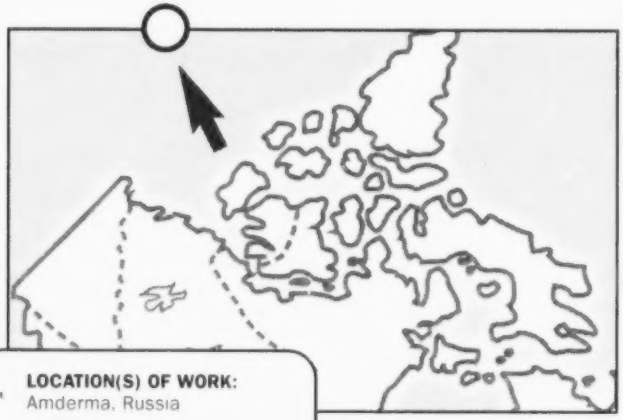
RELEVANCE:

Mercury can come from both natural and man made sources, and is found in the air as either a **vapour** or attached to small particles. Mercury can travel through the atmosphere to the Arctic where it can be deposited along with precipitation (snowfall and rain) or simply fall out of the air attached to airborne particles. Once in the environment, mercury can potentially get into the Arctic **food chain**.

There is recent evidence that concentrations of mercury in the Arctic environment are increasing. At present, mercury vapour is being measured at four different Arctic sites on a routine basis: Alert (Canada), Kuujjuarapik (Nunavik, Canada), Point Barrow (United States) and Svalbard/Spitsbergen (Norway). The addition of a site in the Russian Arctic would help to fill the gap of information on the distribution of mercury in the Arctic environment, and provide data for the development of long-term international strategies to control the release of mercury to the environment. These additional measurements would also add to the understanding of transport transformation and deposition processes of mercury that lead to mercury in the food chain.

PROJECT SUMMARY:

This project will determine trends in atmospheric mercury concentrations and deposition processes of mercury in the Arctic at Amderma, Russia by measuring mercury vapour in the air continuously for at least three years. It will also determine the causes for seasonal and annual variations in mercury concentrations in air and study the circumpolar behaviour of mercury in air by comparing data from different Arctic stations. The mercury data from Russia will add to the understanding of the behaviour of mercury in the Arctic and help determine whether mercury levels are increasing or decreasing.



LOCATION(S) OF WORK:
Amderma, Russia

SCHEDULE:
For more information, please contact project leader directly.

CONTACT INFORMATION:
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TIME FRAME:
April 2000 – March 2005. A report will be made available and presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

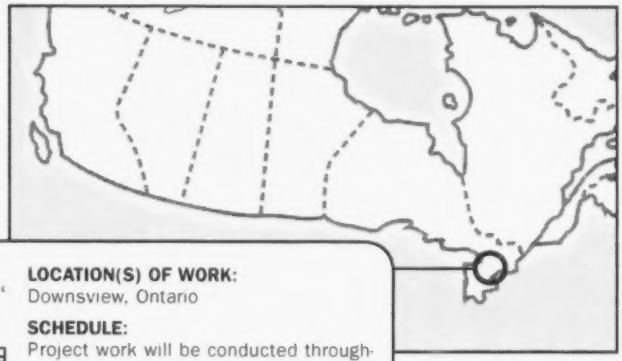
RELATED PROJECTS:
Related projects include "Northern Contaminants Air Monitoring: Persistent Organic Pollutant Measurements" page 88 in booklet, "Atmospheric Mercury Measurements at Alert" page 90 in booklet, and "Atmospheric Mercury Deposition in Nunavik" page 116 in booklet.

Inventory of Global Lindane and Endosulfan Emissions

Q Is there a relationship between global usage of the pesticides lindane and endosulfan and their concentrations in the Canadian Arctic?

RELEVANCE:
Lindane (**hexachlorocyclohexanes (HCH)**) and endosulfan are **persistent organic pollutant (POPS)** pesticides that are used extensively throughout the world, and are considered to be **toxic** to some aquatic and terrestrial species. Lindane and endosulfan have been detected in Arctic air, snow, lake sediments, seawater, and in marine mammals. Since contamination by these pesticides in the Arctic is not a local issue, the key to reducing their transport to the Arctic is the establishment of international agreements to restrict and eliminate their use. Therefore, global emission inventories for lindane and endosulfan are needed to study where these contaminants are coming from, and to understand the link between their usage trends and their concentration levels in the Arctic.

PROJECT SUMMARY:
This project will continue to study the global usage and emission trends over time for priority pollutants in the Arctic. In this year's work, the global usage and emission trends for lindane and endosulfan will be determined and their relationships between these trends and the atmospheric concentration trends of these pollutants in the Arctic will be identified. Specifically, databases containing global usage and emission amounts for lindane and endosulfan linked to geographic location will be developed. These databases will also be used as input to atmospheric models to understand the global emission and deposition relationships of lindane and endosulfan.



LOCATION(S) OF WORK:
Downsview, Ontario

SCHEDULE:
Project work will be conducted throughout the year. For more information, please contact project leader directly.

CONTACT INFORMATION:
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TIME FRAME:
April 2000 – March 2001. The results will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop and the Global Emission Inventories Activities (GEIA) workshop.

RELATED PROJECTS:
Related projects include "Quantifying and Reducing Uncertainty in Model Calculations of Global Pollutant Fate" page 140 in booklet.

Quantifying and Reducing Uncertainty in Model Calculations of Global Pollutant Fate

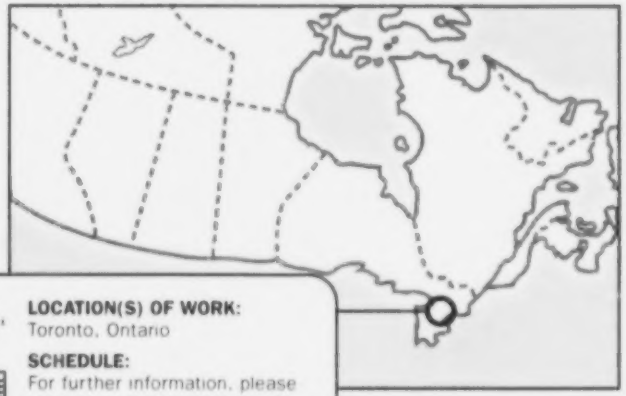
Q How accurate is a model in showing contaminant transport across the Arctic?

RELEVANCE:

Negotiations to reduce or eliminate the transport of **persistent contaminants** to the Arctic are occurring at the international level. Monitoring programs and modelling studies that demonstrate the transport of contaminants to the Arctic are needed to support these negotiations. Contaminants, released into the atmosphere in warm regions of the Earth, go through several cycles of evaporation, travel in air currents, and deposition in cooler regions, eventually reaching the cold climate of the Canadian Arctic where they begin to accumulate. Research results should show how the presence of contaminants in the Arctic **ecosystem** can result in human exposure. Models help to identify source regions and to predict changes in contaminant levels as the environment changes and as the amounts released from source regions change. These models will assist Canadian negotiators with needed information when dealing with the United Nations Environment Program (UNEP) and other international agencies to reduce or eliminate the use of certain chemicals.

PROJECT SUMMARY:

This project will test how well the model describes the transport of selected pollutant chemicals from source regions to the Arctic and how trustworthy the model predictions are. The model will also be used to identify what properties a chemical must possess and how it is to be released in the environment to become an Arctic contaminant. This project is made up of three tasks which will support Canada's international negotiations on reducing or eliminating sources of **persistent organic pollutants (POPs)** which may be transported to the Arctic. First, the global model calculations for **hexachlorocyclohexanes (HCH)** and **PCBs** will be completed and the model will be examined to ensure it is credible. Second, the global model will be used to investigate the global distribution behaviour of organic chemicals. Finally, the results obtained from this global distribution model will be compared with those obtained by other global modelling studies for POPs to identify strengths and weaknesses of different models. This comparison will improve the model.



LOCATION(S) OF WORK:
Toronto, Ontario

SCHEDULE:
For further information, please contact project leader directly.

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Project Leader: Frank Wania
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TIME FRAME:
April 1998 – March 2001. The results will be presented at the Annual **Northern Contaminants Program (NCP)** Results Workshop.

RELATED PROJECTS:
Related projects include "Inventory of Global Lindane and Endosulfan Emissions" page 138 in booklet.

International Action to Control the Long-Range Transport of Contaminants to the Arctic

Q What international actions can be taken to control the transport of contaminants through air and water to the Arctic from outside sources?

RELEVANCE:
International action is required to stop the transport of **contaminants** to the Canadian Arctic and to reduce the accumulation of contaminants in northern **food chains**. This can only be achieved by identifying where the contaminants are coming from and by reducing or eliminating their use at these sources. This can be achieved through international agreements that would limit the production and use of these contaminants.

PROJECT SUMMARY:
Canada will participate in a number of international activities that will help reduce the amount of contaminants that are transported to the North. These activities will assist in determining the significance of contaminant sources, in identifying contaminant transport pathways, and in developing appropriate international controls on emissions. These activities include:

1. Arctic Monitoring and Assessment Programme (AMAP). AMAP monitors man-made pollutants coming into the circumpolar Arctic environment and assesses their effects on all components of the environment. Canada will develop national implementation plans for monitoring various contaminants. AMAP is concentrating on producing new assessments by 2002 under several topics including human health, **persistent organic pollutants (POPs)** and **heavy metals**. The **Northern Contaminants Program (NCP)** will continue to focus on implementing the Canadian contribution to the second phase assessment of AMAP and on providing support to maintain the AMAP infrastructure.
2. United Nations Economic Commission for Europe (UN ECE) Convention. A legally binding protocol for POPs has been agreed to under the UN ECE Convention. This protocol outlines controls and management options for POPs including bans and restricted use. When it was adopted in June 1998, the protocol was signed by 34 countries. When it has been ratified by 16 of those countries, the agreement will be legally binding for the countries which have signed and ratified. By December 1999, it had been ratified by Canada and Norway. Plans will be developed under the Convention to gather trend and survey data to support the protocol. The NCP will have to ensure that its trend and survey activities are compatible with these plans.
3. Action on POPs in Non-UN ECE Regions. Negotiations are underway to have a global legally binding agreement on POPs in place by 2001. Four negotiation sessions have been held in Montréal (June 1998), Nairobi (January 1999),

Geneva (September 1999) and Bonn (March 2000). It is anticipated that the fifth and final session will be held in South Africa (November 2000). The main negotiation issues are capacity building in developing countries to make implementation of the agreement possible and establishing monitoring programs for POPs in the environment, human populations and food of developing countries.

4. Canada/Russia Scientific and Technical Co-operation in the Arctic. Canada will continue to provide opportunities to gather information on the Russian Arctic to understand transport pathways of certain contaminants. The NCP will support the AMAP/Arctic Council plan to compile a **PCB** inventory in Russia, develop remedial plans for PCB contamination and identify alternatives to PCBs.

AMAP UNEP UNECE

For more information, please contact project leader directly.

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TIME FRAME:
April 2000 – March 2001.

Canadian Arctic Indigenous Peoples' Against Persistent Organic Pollutants

Q What is being done to make sure that the views and concerns of northern Aboriginal people play a role in international decisions and controls on contaminants?

RELEVANCE:

No region in Canada feels the negative effects of **persistent organic pollutants (POPs)** on both the environment and human health as intensely as the North. Therefore, Northerners have a strong interest in the success and effectiveness of the current international initiatives to reduce the presence of POPs in the Northern environment. The future success of eliminating **contaminants** from northern **food chains** depends on a high level of concern and a strong will for action at all levels, including individual, community, national, and international levels. For these reasons it is crucial that Northern Aboriginal groups understand the issues and participate in the development of the Canadian negotiating positions and become an integral component of the Canadian and international effort. The **Northern Contaminants Program (NCP)** recognizes and supports such initiatives that link Northern Aboriginal Peoples' concerns over contaminants in the North with global community negotiations. Over the last four years, the Canadian Arctic Indigenous Peoples Against POPs (CAIPAP) has participated in a number of activities to ensure that Northern Aboriginal Peoples' concerns over contaminant issues have been brought to the attention of the global community.

PROJECT SUMMARY:

CAIPAP participated as official observers in the United Nations Economic Commission for Europe's (UN ECE) negotiations for a Protocol on POPs under the Convention on Long-range Transboundary Air Pollutants and is currently involved in the global negotiations of the International Negotiating Committee (INC) through the United Nations Environment Program (UNEP). This year, a CAIPAP representative will continue to co-ordinate the Northern Aboriginal Peoples' position on negotiations for the control of POPs for the UNEP international negotiating committees and for other international meetings. The representative will also ensure that Northern Aboriginal Peoples are informed about national and international initiatives to control POPs.

UNEP UNECE

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TIME FRAME:
April 1997 – March 2001.

Appendices

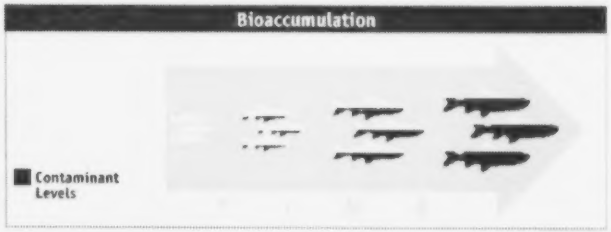
Glossary

ABIOTIC
An abiotic environment refers to the non-living natural environment made up of non-living, **inorganic**, objects such as rocks and minerals.

ARCHIVED
Archived samples are samples (e.g. animal tissues or organs) that are stored, usually in freezers, for future analysis.

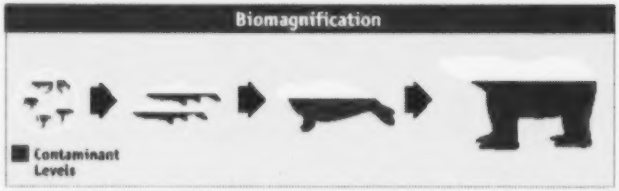
ARSENIC
Arsenic is a steel grey, brittle metallic element that is found naturally in rocks and soil. Some of its compound are poisonous and are used as agricultural **insecticides** and poisons. Arsenic can **bioaccumulate** in plants and animals.

BIOACCUMULATION
Bioaccumulation is the build-up or storage of substances (such as contaminants) in the bodies of animals over time. Bioaccumulation of **contaminants** can occur by eating animals or drinking water that contain these contaminants. Contaminants that bioaccumulate are very slow to change or do not change to a chemical form that can be digested and eliminated by the animal.



BIOAVAILABILITY
A chemical is bioavailable when it is in a form that can be taken up or absorbed by plants and animals.

BIOMAGNIFICATION
When an animal eats a plant or another animal, it consumes all the contaminants stored in that food. Contaminants can biomagnify in animals that use other animals for food because the concentration increases with each step from prey to predator.



BIOMONITORING
Biomonitoring is a method of testing and monitoring different contaminants in the environment through living organisms. For example, polar bear tissue may be analyzed as a way of biomonitoring **POPs** in the Arctic marine environment.

BIOTA
The animal and plant life (i.e. living things) of a region.

BIOTIC
A biotic environment refers to living organisms in the environment.

BROMINATED DIPHENYL ETHERS (BDPES)
Brominated diphenyl ethers are a group of human-made **organobromine** chemicals that are used as flame retardants in various plastic materials, such as polystyrene. (See also **PBBs**)

CADMIUM
Cadmium is a **heavy metal** found naturally in soils and rocks. It is soft and has a silvery colour. It is mined and used in some industries to make things such as batteries, some **pesticides**, and some types of paint.

CANCER
Cancer is a disease that results in uncontrolled, abnormal growth of the body's cells resulting in tumors (large masses of cells). It may be caused by exposure to certain substances, such as some kinds of **contaminants**.

CHLORDANE
Chlordane is a colourless, odourless **POP** used as an **insecticide**. It can affect the nervous system of humans and wildlife. Chronic exposure to humans can cause liver damage and possibly cancer. It is currently restricted in use for such things as termite control and non-food plants.

CHLORINE
Chlorine is a naturally occurring, poisonous greenish-yellow gaseous non-metallic element used for purifying water, bleaching and in the manufacturing of many organic chemicals. It occurs naturally only as a salt, as in sea water.

CONTAMINANTS
A contaminant is a substance that is found in a place where it should not be. This does not necessarily mean that it is harmful, but depending on what it is and the amount that is present, it may be. The types of contaminants that are found in the Canadian north include:

- **Persistent Organic Pollutants (POPs)**, a group of mostly human-made chemicals which includes the substance called **organochlorines (OCs)** and can stay in the environment for many years without changing. They can be transported long distances in the atmosphere.
- **Heavy metals** such as mercury, cadmium, and lead; and
- **Radionuclides** such as cesium, strontium, and polonium.

DDE
DDE is a **POP** found in the environment as a result of the breakdown of **DDT**, an **insecticide**.

DDT
DDT is a **POP** developed in the 1940s to kill lice and to kill biting insects that carry diseases such as malaria, yellow fever, and typhus. DDT was heavily used to kill insects feeding on crops in the 1950s and 1960s in the Great Lakes region until it was found to be harmful to other forms of life. DDT is banned in Canada.

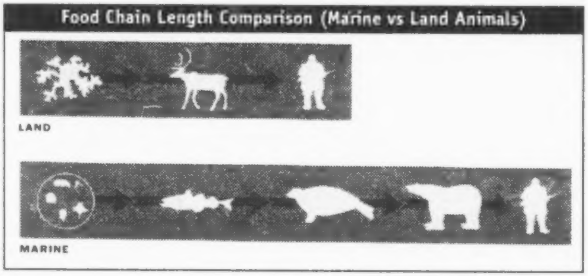
DISEASE RESISTANCE
Disease resistance refers to the ability of animals and plants to withstand the attack from a disease.

ECOSYSTEM
An ecosystem is a system that is formed by the interactions of organisms with their non-living environment. The organisms and the environment work together as a unit, called an ecological unit.

ENDOSULFAN
Endosulfan is a **POP** generally used as an **insecticide** in the control of crop insects and mites.

FALLOUT
Fallout describes how particles that are held in the air descend to the ground and accumulate on surfaces. Fallout is generally associated with particles that have been sent into the atmosphere following a nuclear explosion or a volcanic eruption and slowly descend, falling onto ground or water surfaces.

FOOD CHAIN
Plants and animals can be linked together in feeding relationships called food chains. At the bottom of food chains are green plants that convert sunlight into food energy for the rest of the chain. Animals that eat the plants are then eaten by another animal, and so on up the chain. The number of animals involved can vary. For example, in the North, the lichen ->caribou-> human food chain has fewer feeding links, and is much shorter than the algae (a small plant that lives in water but needs sunlight)-> fish->seal->polar bear->human food chain. In nature, food chains overlap to form **food webs**.



FOOD CONSUMPTION ADVISORIES
Food consumption advisories are sometimes issued by Territorial Health officials in association with Health Canada when they determine that the level of **contaminants** in a traditional/country food may risk the health of those who eat this food. Such an advisory may recommend, for example, that people should only eat a certain number of livers from a particular fish species in a year.

FOOD WEB
A food web is the interaction of **food chains**. Food chains, which involve a direction from lower to higher ordered organisms, interact with one another in nature and form webs. These webs are more complex then chains as different organisms cross over into other chains and complicate the flow of energy from one species to another. (See **food chain**)

HEAVY METALS

Heavy metals are naturally-occurring metals found in rocks and soils. They are also released to the environment by human activities. They generally do not decay into other elements and therefore persist in the environment. Examples of heavy metals are **mercury** and **cadmium**.

HEXACHLOROCHYCLOHEXANE (HCH)
Hexachlorochyclohexane (HCH) is an **POP** used to kill insects, an **insecticide**. It does not break down easily in the environment, and can be transported great distances in the atmosphere.

IMMUNE SYSTEM
The immune system is made up of cells and tissues responsible for recognizing and attacking foreign microbes and substances in the body.

INORGANIC
Inorganic material is inanimate (e.g. non-living) in nature and makes up the **abiotic** environment.

ISOMER
One of two or more compounds that contain the same number of atoms of the same elements but differ in structural arrangement and properties.

ISOTOPE
Isotopes are species of atoms of the same element with nearly identical chemical behaviour but with different mass and physical properties. For example, different isotopes of carbon and nitrogen can be found in nature.

LEAD
Lead is a soft, blue-grey, easily-worked heavy metal that is naturally present in rocks and soils. It is used to make some kinds of glass, shot for shotguns, and combined with other metals for use in a variety of metallic items. Lead may be released to the environment by human activities, including the use of leaded-gasoline (in North America, lead was added to gasoline until the 1980s). Lead can be **toxic** to living things. In animals and people, lead accumulates in the brain and bones.

LONG-RANGE TRANSPORT
Long-range transport refers to the movement of **contaminants** through the atmosphere or the ocean from distant sources. Many contaminants that are detected in the Arctic have been used in relatively far away places but travel through the air and ocean currents eventually reaching the Arctic where they are deposited.

MERCURY
Hg Mercury is a **heavy metal** that is naturally found in rocks and soil in combination with other chemicals. It is the only metal that is liquid at room temperature. It is silvery in colour and flows easily so it is sometimes used in thermometers. There are many human-made sources of mercury that are released to the atmosphere. Also, mercury may be released when soils are flooded in the creation of reservoirs for making electricity. Mercury is **toxic** to most living things. It accumulates in the liver, kidneys, hair, and skin of animals and people.

METHYLMERCURY
Mercury, like other metals, can be found in different chemical forms in the environment. Methylmercury is the form of mercury that is most **toxic**. Methylmercury can also **bioaccumulate** and **biomagnify** in **food webs**.

METABOLISM
The sum of physical and chemical processes occurring within a living cell or organism that are necessary for the maintenance of life. Under these processes, substances are broken down to provide energy for certain vital processes while other substances, necessary for life, are created.

METABOLITE
A substance essential to the **metabolism** of a particular organism or to a particular metabolic process

NEUROTOXIC
Neurotoxic effects are caused by substances that are considered to be **toxic** to living organisms. These substances can cause irreversible damage to the central nervous system.

NORTHERN CONTAMINANTS PROGRAM (NCP)
The Northern Contaminants Program (NCP) has been developed through consultation with the scientific community, Northern Aboriginal organizations, other governmental departments, and Northern communities. Its goal is to reduce and wherever possible eliminate contaminants in traditional/country food. This goal is supported by involving Northerners in the program, and by providing them with the tools and information for making their own informed decisions on food consumption.

ORGANIC
Organic material is derived from living organisms and is made up of carbon-based compounds.

ORGANOBROMINE
Organobromines are bromine-containing chemicals made by humans. Several organobromines are used as flame retardants in plastics.

ORGANOCHLORINES (OC)
Organochlorines (OCs) are chlorine-containing chemicals made by humans. Organochlorines dissolve in fats and oils, and therefore are stored in the fat and blubber of animals (i.e. bioaccumulate) and are passed on through the food chain (i.e. biomagnify). Examples of OCs include: **toxaphene**, and **chlordane**. Organochlorines can be **toxic** or poisonous to living things.

PCBs
Polychlorinated biphenyls (PCBs) are a group of human made, industrial **POP** chemicals. There are many different kinds of PCBs. Because they do not conduct electricity, PCBs were used in electrical transformers as insulators since the 1930s. PCBs do not break down easily in the environment and there is concern that they may be harmful to living things. Some kinds of PCBs are thought to cause **cancer** and may contribute to other subtle effects in unborn children. The use of PCBs was banned in many countries, including Canada, in the 1970s.

PERSISTENT
Persistent, when referring to chemicals, is the resistance of a chemical to break down. A persistent chemical, once introduced, stays in the environment for an indefinite length of time.

PERSISTENT ORGANIC POLLUTANTS (POPS)

Persistent organic pollutants (POPs) are a group of mostly human-made chemicals which includes the substances called **organochlorines (OCs)**. Many POPs can be transported long distances in the atmosphere and can stay in the environment for many years without changing.

PESTICIDES
Pesticides are poisons used to kill pests (plants or animals that are a nuisance or harmful). There are two main types: insecticides used to kill insects, and herbicides used to kill weeds, mold, and fungus. **Chlordane**, **toxaphene**, **HCH**, and **DDT** are examples of pesticides.

POLYBROMINATED BIPHENYLS (PBBS)
Polybrominated biphenyls are a group of human-made **organobromine** chemicals that are used as flame retardants in various plastic materials, such as polystyrene. (See also **BDPEs**)

QUALITY ASSURANCE/QUALITY CONTROL

QA/QC

Because research is conducted by many different people in many regions across the country, it is often difficult to ensure that the same standards in producing data are in use. Quality assurance/quality control is a system of procedures and corrective actions that attempt to ensure that the different research studies, environmental monitoring and sampling, and other technical and laboratory activities are comparable with each other and the data reported are of the highest quality possible.

RADIONUCLIDES

Radionuclides are atoms that emit radiation and, like **heavy metals,** are naturally present in rocks and soils. They may also be human-made. Certain kinds of radionuclides have been released to the environment through atmospheric testing of nuclear weapons, nuclear waste dumping and uranium mining. Radionuclides tend to accumulate in the bones and muscles of animals and people. Natural radionuclides in the Canadian North include polonium and **lead**.

RISK ASSESSMENT
The qualitative and quantitative study of the risk posed to human health and the environment by the presence and/or use of specific pollutants.

SELENIUM
Selenium is a nonmetallic element that resembles sulfur. It can be naturally found in rock and soils from some areas and it has been suggested that at the right concentration, it can counteract the effects of **mercury**, but this is unproven as of yet.

TOXAPHENE
Toxaphene is a **POP** chemical that was used as a **pesticide** from the 1950s to 1970s. It is very **toxic** to living things, especially fish. Toxaphene has never been licensed for use in Canada, and it was banned in the United States in 1982.

TOXIC (TOXICITY)
Toxic (toxicity) refers to the capability of a substance to cause harm to humans, animals, or other living things. In common usage, the term toxic substances refers to chemical substances that are capable of causing harm at very low levels of exposure.

TOXICOLOGY
Toxicology refers to the scientific study of the effects, chemistry, and treatment of harmful (**toxic**) substances.

TROPHIC LEVELS
Levels in a food web characterized by organisms which are the same number of steps removed from the primary producers of **ecosystems** (e.g., generally aquatic and terrestrial green plants comprise the first tropic level, and plant-eating organisms comprise the second.)

VAPOUR
A substance in the gaseous state, as distinguished from a liquid or solid state.

Affiliations and Project Leaders

The following list can be used to search for a project by affiliation or project leader.

Centre for Indigenous Peoples' Nutrition and Environment (CINE) and McGill University
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Kuhnlein, Harriet: pages: 18, 122

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Council of Yukon First Nations (CYFN)
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Department of Fisheries and Oceans (DFO)
Lockhart, Lyle: pages: 42, 44, 46, 82
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Department of Indian Affairs and Northern Development (DIAND)
Mills, Carole: page: 40
Palmer, Mark: pages: 10, 12
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Government of the Northwest Territories (GNWT)
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Key Subject Areas and Contaminants

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CHLORDANE
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HCH
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MERCURY (INCLUDING METHYLMERCURY)
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SELENIUM
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TOXAPHENE
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TRADITIONAL FOOD
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TRADITIONAL KNOWLEDGE
pages: 8, 32, 108

For More Information

If you wish to obtain more information on any of the projects within this booklet or have any questions regarding contaminants in general, please feel free to contact any of the persons listed below, they will be glad to assist you.

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Acknowledgements

We would like to thank all project team members for the time they took to provide project summaries. Thanks also to Russel Shearer, Janine Murray and Sarah Kalhok who took the time to review, edit and supply comments and recommendations on the 2000 – 2001 edition of the Northern Contaminants Program Summary Booklet.

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French and Inuktitut version available.
(Inuktitut translation by William Qamukaq)